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THE COMBINED USE OF PENICILLIN AND HEPARIN IN THE TREATMENT OF SUBACUTE BACTERIAL ENDOCARDITIS*

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EXPERIMENTAL medicine is no longer the work of any single individual. Each research is dependent upon the labours of many men. More often than not, the pioneer work done by the scientist with the greatest vision remains obscured and hidden through the very fundamental nature of his contribution whilst acclaim comes to the less important individual, visible only because he stands on the shoulders of his predecessors.

It was the fate of Louis Gross, in whose name this Lectureship was founded, to be amongst those who pursued fundamental researches in the fastness of his laboratory, far from the glare of the public view. He occupied himself with studies of the circulation of heart muscle and of the heart valves; with the experimental conditions under which infections involve the circulatory structures, and the manner in which these structures react. When his tragically premature death occurred, he had not as yet been able to transmute his many accomplishments into the currency of therapeutics.

It is a source of profound regret to me that Louis Gross could not have lived to see the beginning of the conquest of the disease in which he was so vitally interested. I should like to think that the Louis Gross Memorial Lecture may serve a dual purpose; to keep alive the memory of a friend and associate, and to stress the importance of cultivating and nurturing those who, like Louis Gross, give promise of aiding in man's eternal struggle to conquer disease.

HISTORICAL

The subject of subacute bacterial endocarditis requires few introductory remarks before an audience of this character. Since 1906 and culminating with the publication of his monograph[1] in 1941, Dr. Emanuel Libman has described the clinical syndrome in all its ramifications and clearly delineated the difficulties imposed upon the therapeutic attack; he established the fact that the disease, with few exceptions, was of streptococcal origin; he demonstrated, as far back as 1910, that it was possible to obtain positive blood cultures in 73 of his first 75 cases; he astutely assumed that the portal of infection was "about the teeth or their roots, the tonsils and accessory sinuses or other parts of the upper respiratory tract"; he stressed the importance of the previously existing valvular defect, whether acquired or congenital, as a predisposing factor in the production of the disease; he described fully the usual and the bizarre pathological changes associated with the disease; he emphasized, throughout his clinical thesis, the pathognomonic features particularly referable to the eruptive phenomena, changes in skin colour, the frequent embolic complications and the wide range of forms in which the disease might masquerade.

Early in the course of his studies, Dr. Libman recognized that severer forms of the disease occasionally progressed to spontaneous recovery and estimated that this happy outcome was encountered in at most 3 to 5% of the afflicted; he also recognized that there was a milder or bacteria-free stage of the disease in which the patient might not be seen until recovery had occurred. Dr. Libman noted that an occasional recovery was reported using any one of a variety of chemotherapeutic or physiotherapeutic modalities. With his usual perspicacity, he cautioned that the lack of consistent effect from any one given remedial agent suggested that the isolated "cure" may have been more likely an

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instance of the spontaneous recovery that is occasionally noted in the severe forms or of an example of the milder bacteria-free syndrome.

Dr. Libman's monograph concludes with the statement of the status of therapy in 1941; in his own words:

> "At the present time, therapy in subacute bacterial endocarditis remains unsatisfactory. . . . A chemotherapeutic agent more effective on the streptococcus viridans than any at present available is needed and may be found; . . . The future looks more promising than ever before."

It is my purpose this evening to add a chapter to Dr. Libman's monograph; we shall present data which indicate that combined therapy using an anti-infective agent and an anticoagulant produced what appears to be clinical cure in approximately 75% of a consecutive series of 54 unselected patients.

Laboratory Data

The basis of the present clinical investigation is dependent upon experimental thrombotic bacterial endocarditis[2] as it is produced in the rabbit according to techniques devised in association with my colleagues Drs. Rosenblatt and Lederer. This work indicated that fibrin and blood elements served as an impenetrable barrier to effective chemotherapeusis; the offending organisms, lying deep in the vegetation, were well protected from circulating anti-infective agents. To accomplish disappearance of vegetations, the combined use of a suitable chemotherapeutic agent and an anticoagulant was required. Heparin was successfully employed, in these experimental animals, to arrest the deposition of blood platelets and fibrin which served as a protective nidus and as a stimulus for bacterial growth; relatively fresh, artificially induced thrombi in the animal could be dissipated following the use of the anticoagulants. In corroboration of the experimental investigations, were the observations obtained from human post-mortem material which indicated that heparin has a possible erosive effect on endocardial vegetations.

Evolution of the Clinical Studies

The attempt to translate experimental investigation into terms of clinical therapeusis was at first disappointingly unsuccessful. The intravenous administration of heparin was fraught with danger and the expense was prohibitive in many instances. Whether given by continuous venoclysis or fractional intravenous injection, heparin therapy was cumbersome, accompanied by severe reactions and associated with treatment deaths in altogether too many instances to justify its continuance. To overcome these shortcomings, a special method[3] was devised for the subcutaneous deposition of the drug, through adoption of the Pitkin menstruum, composed of gelatine, dextrose, glacial acetic acid and water in definite proportions, which was developed to regulate the rate of release of water-soluble drugs injected intramuscularly or subcutaneously. By this technique, a slower and more equable absorption of heparin was accomplished.

When this portion of the clinical technique had been solved, a combined attack was inaugurated, using the sulfonamides in association with the heparin. A group of 17 patients with subacute bacterial endocarditis was treated, but there were no more than two apparently authentic "cures", insufficient to justify the conclusion that a specific therapeutic result had been obtained beyond what might be noted with the occasional spontaneous cure or the development of Dr. Libman's bacteria-free state. Nevertheless the two successful issues were sufficient to justify a continued project, more particularly since one of the necropsied cases showed an apparent diminution in the size of vegetations, which were smaller and more discontinuous than might have been anticipated.

With the introduction of penicillin therapy, we were sufficiently fortunate to obtain supplies through the courtesy of Mr. John L. Smith of the Charles Pfizer Company and later, also, through the co-operation of the Committee on Penicillin Therapy of the National Research Council under the ægis of Dr. Chester S. Keefer. The technique was modified by the replacement of sulfonamide with penicillin; continuation of subcutaneous depositions of heparin was made possible by the co-operation of Drs. Ralph D. Shaner and Leo Pirk of Roche-Organon, Inc., which company gratuitously furnished all heparin preparations.

As a preliminary to the inauguration of penicillin-heparin therapy, experiments were devised to determine the effects of heparin on solutions of penicillin (Table I). The data indicated clearly that the anticoagulant had no measurable effect on the anti-infective potentialities of the penicillin; indeed, there was some suggestion of possible synergism or potentiation.

TABLE I.

USE OF HEPARIN IN PENICILLIN ASSAYS

Experiment No. 1, (1-4-44)

	ml. Penicillin solution		*mgm. Heparin*	*mgm. Heparin-O.U. ratio in 10 ml.*	*Series—dilution test results*
A.	9	+	0.5 in 1 ml. H_2O	0.5 mg./1,120 O.U.	124 O.U./ml.
B.	9	+	1.0 in 1 ml. H_2O	1.0 mg./1,120 O.U.	145 O.U./ml.
C.	9	+	5.0 in 1 ml. H_2O	5.0 mg./1,120 O.U.	145 O.U./ml.
D.	9	+	10.0 in 1 ml. H_2O	10.0 mg./1,120 O.U.	124 O.U./ml.
Control	9	+	1.0 ml. H_2O		126 O.U./ml.

Experiment No. 2, (1-8-44)

	ml. Penicillin solution		*mgm. Heparin*	*mgm. Heparin-O.U. ratio in 6 ml.*	*Series—dilution test results*
A.	5	+	0.5 in 1 ml. H_2O	0.5 mg./640 O.U.	128 O.U./ml.
B.	5	+	1.0 in 1 ml. H_2O	1.0 mg./640 O.U.	128 O.U./ml.
C.	5	+	5.0 in 1 ml. H_2O	5.0 mg./640 O.U.	135 O.U./ml.
D.	5	+	10.0 in 1 ml. H_2O	10.0 mg./640 O.U.	128 O.U./ml.
Control	5	+	1.0 ml. H_2O		128 O.U./ml.

DOSAGE SCHEDULE—TREATMENT STATISTICS

The administration of heparin and the determination of optimum dosage are easily gauged by the tilt-tube Lee-White modification of Howell's method[4] for determining blood coagulation time. A reading of 30 to 60 minutes is regarded as satisfactory evidence of an effectual anticoagulant level. Coagulation times above one hour are wasteful of the drug and may indeed be hazardous, particularly if the clotting time is prolonged to two or more hours. Effectually to heparinize the blood necessitates subcutaneous deposits of 300 mgm. every second or third day or approximately 200 mgm. daily of the aqueous commercial product when incorporated in the venoclysis. Hyper-reactors require lesser amounts of heparin and hypo-reactors need additional dosage.

TABLE II.

TREATMENT STATISTICS—SUMMARY

DOSAGE

Penicillin sodium salt (Oxford units)

	Range	
	Low	*High*
Daily dosage	40,000 to	1,000,000
Total dosage	867,000 to	48,930,000
Heparin sodium salt (milligrams)		
Total dosage	400 to	11,500

COURSES OF PENICILLIN-HEPARIN THERAPY

NUMBER OF COURSES REQUIRED IN EACH CASE OF THE SUCCESSFULLY TREATED GROUP

No. of courses	*No. of patients*
1	27
2	8
3	4
4	1
Total	40

The estimation of penicillin dosage presents greater difficulty and requires the co-operation of the laboratory. Probatory sensitivity tests must be done on the offending organism. In general, the causative agents are inhibited within the dilutions of 0.007 to 0.5 Oxford units of pencillin per c.c. of test broth. Under these circumstances, the daily dosage of penicillin varies from 40,000 to 1,000,000 Oxford units (Table II); total individual unitage may range between the low of 867,000 and a high of 48,930,000 Oxford units. It may be observed parenthetically, as a tribute to the non-toxicity of the presently available preparations of penicillin, that the latter amount could be introduced without significant toxicological phenomena.

At the outset, through limitations in the supply of penicillin, an effort was made to reduce the span of treatment to an absolute minimum so that material might be available for as many patients as possible. Originally, a two-week course of treatment was projected and was actually found adequate for the accomplishment of the disappearance of early endocardial lesions. Unfortunately, this two-week course alone was insufficient for patients who had been ill for longer periods of time and a three-week course was regarded as essential for those who had been ill for two to four months; a four-week course was believed necessary for those who had had the disease for more than four months. It is our present opinion that our current practice

of a five-week course must be made the standard minimum when the supplies of penicillin justify treating the individual patient in optimum fashion. Additional courses are given whenever necessary and are well tolerated. Multiple courses are not uncommon in the advanced cases.

Based on penicillin-sensitivity tests, it appears that an average daily dose of at least 200,000 Oxford units is required. Increased dosage or a more prolonged span of treatment is necessary for patients who have deteriorated, or who show severe clinical manifestations of bacterial activity such as embolization, marked splenomegaly and violent temperature reactions. Additional factors that enter into the determination of the dosage level are the sensitivity of the offending organism to penicillin and the capacity of the patient to develop and maintain an adequate level of the anti-infective agent in the blood.[5] To be therapeutically effective, penicillin blood levels must be far in excess of the *in vitro* bactericidal requirement; the best clinical results are achieved when the average unitage of penicillin is sufficient to develop and maintain a blood serum level of five to ten times the sensitivity figure. Inadequate dosage invites treatment failure and the organisms may acquire resistance that is so high as to render future therapeutic levels virtually unattainable. In at least one instance, we observed a forty-fold increase in the resistance of the organism to penicillin.

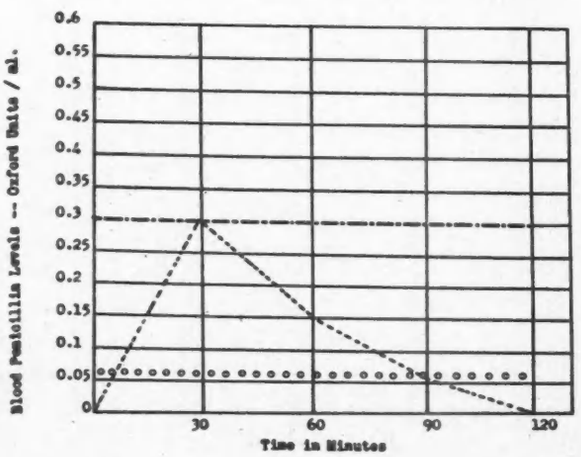
THE TECHNIQUE OF TREATMENT

It is our custom to devote the first few days of therapy to the determination of penicillin levels following intramuscular and intravenous administrations of the drug. During this probationary period, heparin is withheld primarily to obviate any dislodgment of loosely attached vegetations.

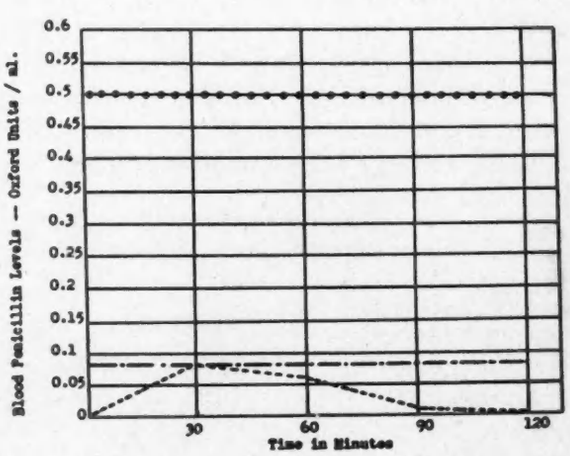
Our experience indicates that intravenous injection of penicillin is decidedly the method of choice (Graphs I and II); intramuscular injections result in the attainment of a higher peak which cannot be maintained and which is fol-

COMPARATIVE EFFECTIVENESS OF FRACTIONAL INTRAMUSCULAR PENICILLIN THERAPY VERSUS CONTINUOUS VENOCLYSIS.

Total Daily Dosage = 240,000 Oxford Units.



Graph I.



Graph II.

Graph I.—Patient A.C. Subacute bacterial endocarditis, *Streptococcus viridans* inhibited by 0.06 O.U. per c.c. of test broth. Penicillin blood level of 0.3 O.U. per c.c. serum with daily dosage of 240,000 O.U. given by continuous venoclysis. One three week course of treatment accomplished successful result. Intravenous blood level of 0.3 O.U. per c.c. of serum achieved only a small fraction of treatment period when penicillin was administered fractionally, 20,000 O.U. units every two hours.

Graph II.—Patient S.G. Subacute bacterial endocarditis due to *Streptococcus viridans* of the resistant variety, requiring 0.5 O.U. per c.c. test broth for complete inhibition. Therapeutic penicillin blood levels could not be obtained with daily dosage of 240,000 O.U. by either intravenous or intramuscular route. Patient was completely refractory to treatment even when daily dosages were stepped up to 1,000,000 O.U. per day.

lowed by a prompt and abrupt decline so that, for a sizable fraction of the treatment day, the blood is virtually free of detectable amounts of penicillin. In contrast, the intravenous injection produces a constant and sustained level. Only rarely, when the patient is in congestive failure so that the additional intravenous administration of the bulk of fluid seems more than the circulation can maintain, do we resort to intramuscular introduction; at the earliest possible opportunity, then, we revert to the continuous intravenous drip employing minimum amounts of diluent. In all instances, when available, Ringer's solution is employed as the vehicle; the patient is placed on a salt-poor intake and heparin is deposited subcutaneously as soon as the preliminary steps have been completed.

Accessory therapeutic measures include the use of high caloric, high vitamin diets, supplementary multivitamin preparations, the use of hæmatinics in liberal dosage where there is anæmia and the resort to frequent transfusions when indicated. The latter require temporary interruption of heparinization and hence are postponed, if possible, till the termination of treatment.

TABLE III.

REACTIONS OCCURRING DURING THERAPY—SUMMARY

	Chills and fever	*Fever*	*Local pain*	*Regional angiitis*	*Regional adenopathy*	*Urticaria*	*Vesicular eruptions*
Penicillin intravenous	Rare	Rare	0	Frequent	0	Occasional	Occasional
Penicillin intramusuclar	0	0	Common, degree variable	0	Occasional	0	0
Heparin subcutaneous	0	Common	Common, degree variable	0	Occasional	0	0
Heparin intravenous	0	Common	0	0	0	0	0
Penicillin and heparin combined	Not Uncommon*	Common	Uncommon	Occasional	Uncommon	Occasional	Occasional

*Causative factor(s) not clear.

TOXICITY

Reactions to treatment occur frequently, Those of minor importance include chills, fever, local pain, regional angiitis, regional adenopathy, urticaria and vesicular eruptions (Table III).

Febrile reactions are rather common and may be ascribed to a variety of factors. There are the obvious pyrogenic factors such as air-borne contaminants. This is controlled by using sterisol bottles and periodic refrigeration. The substitution of viscose instead of rubber tubing eliminates a small fraction of reactions but does not justify its universal use. The incidence of troublesome regional angiitis with its attendant rigors and sharp rises in temperature can be reduced by changing veins and apparatus every 3 or 4 days. Wherever possible a vein about the wrist or forearm is used to allow freedom of movement.

Thrombophlebitis seldom occurred in our heparinized patients even when this was a troublesome complication of the early penicillin era. Elaborate immunological tests done with early crude and progressively purer products of penicillin have failed to elicit any instance of allergy in any of our patients despite multiple courses of intensive and extensive therapy.

Febrile reactions due to heparin are frequent, for the most part due to excessive anticoagulant activity. These are overcome readily by the mere withdrawal of the drug. One patient under combined penicillin-heparin therapy developed clinical manifestations of sensitivity to heparin. Attempts to resume the conjoint therapy were followed by episodes of chills and fever, the last one being associated with generalized urticaria. Intracutaneous tests were negative to penicillin but gave a moderate reaction to heparin. He has since received as much as 1,000,000 Oxford units of penicillin daily intravenously for some weeks without untoward reactions.

Urticaria has, at times, been troublesome, mostly post-therapy and is almost invariably attributable to penicillin.

RESULTS OF THERAPY

The results of therapy of subacute bacterial endocarditis, using the combination of the intravenous introduction of the anti-infective agent and mostly subcutaneous implants of the anticoagulant, have been tabulated according to the

records of 54 consecutive and unselected patients (Table IV). Many of our patients were in pitiful condition when therapy was inaugurated. In certain instances, congestive failure had reduced them to the point where any form of therapy was associated with considerable hazard. Other patients were in the ulcerative phase of the endocardial disease and were throwing off emboli from friable and necrotic vegetations. Despite the precarious manifestations of many of the afflicted, we had no choice other than to inaugurate therapy, since refusal was tantamount to the imposition of a death sentence. Had we chosen to treat only those patients in the earlier stages of the disease and to eliminate

TABLE IV.

RESULTS WITH PENICILLIN-HEPARIN IN SUBACUTE BACTERIAL ENDOCARDITIS

Total number of cases (consecutive and unselected).		54	% 100
Duration of illness prior to to penicillin-heparin therapy (weeks).....	1 to 78		
Penicillin sensitivity of causative organisms (Oxford units).....	0.007 to 0.5		
Number of cases in which therapy was successful..		40	74
Patients living.....	37		
Patients deceased—other causes.....	3		
Post-therapy period of observation (months).....	2 to 15		
Number of cases in which therapy failed.....		14	26

those with manifestations of circulatory failure, ulcerative lesions and embolic complications, a considerably higher incidence of favourable accomplishment might have been reported.

As the records now stand, 54 patients were treated by a combination of anti-infective, anticoagulant therapy. The duration of illness prior to treatment varied from one to seventy-eight weeks; the penicillin sensitivity of the etiological organism varied from 0.007 to 0.5 Oxford units (readily inhibitable to very resistant). Fourteen, or 26% of the group are recorded as failures; 40, or 74% may be regarded as satisfactory results. In the latter group, 37 of the 40 are alive and many have resumed useful occupations; 3 have died of other causes. In the group of treatment failures, there have been 13 deaths from progressive circulatory failure, coronary occlusion, embolization and lobar pneumonia, or a total of 16 fatalities in the original roster of 54.

TREATMENT FAILURE

Treatment failure may be attributed to patient-factors, refractoriness of the causative organism or reinfection with the original or a different type of organism.

Of the 14 treatment failures (Table V), it is

TABLE V.

ANALYSIS OF FACTORS IN FAILURES OF PENICILLIN-HEPARIN THERAPY—SUMMARY

	No. of cases	%
1. Patient factors:		
a. Cardiac failure.....	4	28.5
b. Cerebral embolism.....	3	21.4
c. Inanition.....	1	7.2
d. Intercurrent infection.....	2	14.3
2. Organism refractory.....	3	21.4
3. Reinfection.....	1	7.2
Total.....	14	100.0

our opinion that 10 might be attributed to inability of the patient to withstand the ravages of the infection and to utilize the full benefits of combined anti-infective, anticoagulant therapy. At least 4 of the patients suffered from circulatory failure, 3 encountered cerebral embolizations, 1 had profound inanition and 2 had intercurrent infections, notably lobar pneumonia.

A second cause for treatment failure in 3 patients was the refractoriness of the organism. In unreported studies made by Prof. J. M. Sherman of Cornell University, an attempt was made to establish a correlation between streptococcus typing, penicillin sensitivity and the clinical response. Of our series of 54 patients,

TABLE VI.

VARIETY OF STREPTOCOCCUS AS A POSSIBLE INFLUENCE ON PROGNOSIS

PRELIMINARY REPORT ON WORK IN PROGRESS
(Kindness of Prof. J. M. Sherman, Cornell University)

Causative organism	*No. of cases*	*Treatment successful*	*Reinfection*	*Fatal outcome*
Streptococcus sp....	4	0	1	3
Streptococcus mitis.	7	6	0	1
Streptococcus bovis.	2	2*	0	0
Total.....	13	8	1	4

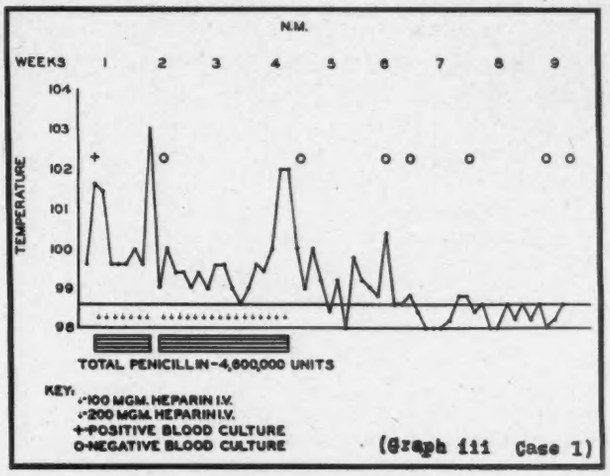
Streptococcus sp.: Apparently a new and distinct variety of streptococcus. Strains belonging to this variety show rather homogeneous cultural and biochemical reactions.

Streptococcus mitis: The common throat viridans streptococcus.

Streptococcus bovis: Similar to so-called "Bargen streptococcus".

*One of these patients, N.M.—Case 32, subsequently died of heart failure. No evidence of bacterial activity at autopsy.

Prof. Sherman worked with 13 different organisms and established the presence of three different species (Table VI). Three patients, infected with a previously unidentified streptococcus, were resistant to therapy and all three succumbed. The blood of 7 patients disclosed a *Streptococcus mitis,* apparently more sensitive to penicillin since six of the seven recovered and there was but one fatality; the remaining two victims were infected by *Streptococcus bovis* and one of these recovered while the other died. Significantly, the autopsy on the fatal streptococcus bovis infection revealed evidences of a healed endocarditis.



The last treatment failure in a surviving patient is an instance of reinfection with another strain of streptococcus. Studies by Prof. J. M. Sherman indicate that the organism recovered from the blood stream during the initial and the subsequent attack were different. This suggests that the patient was cured of his disease, but not necessarily immunized to subsequent bacterial invasion. The original strain is *Streptococcus salivarius,* whereas the more recent strain is significantly the unidentified streptococcus found, as previously mentioned, only in patients who were resistant to therapy. It will be especially interesting to observe the response to the current course of treatment.

DEATHS

In the series of the 54 original patients, there were 16 deaths. Thirteen of the deaths occurred in the group of treatment failures as previously indicated, three of the fatal issues occurred in those who had been satisfactorily treated. The autopsies of two of the satisfactorily treated patients have afforded an interesting insight into the disputed problem of a temporary sterilization of the blood versus actual cure. Evidence in favour of actual cure is afforded by the de-

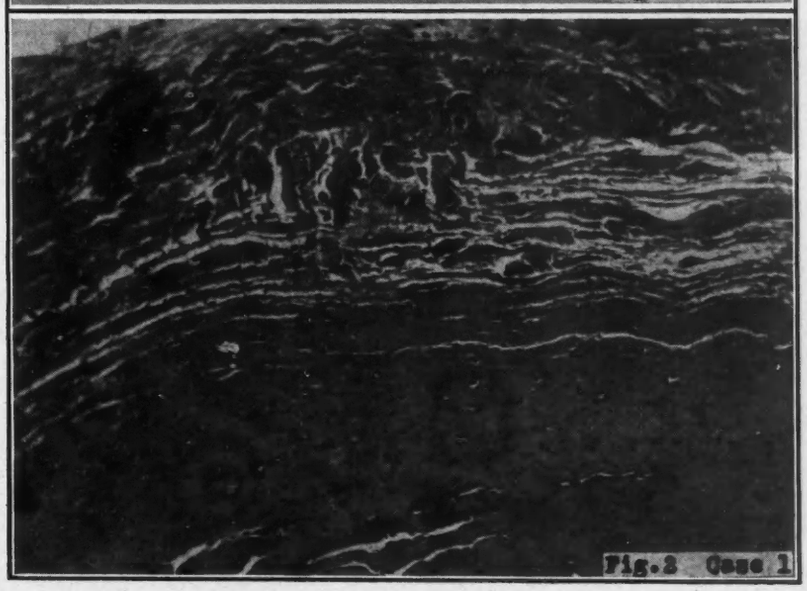


Fig. 1.—Aortic valve. Note stump-shaped cusp which is fibrotic and completely endothelialized. **Fig. 2.**—Stump of aortic cusp (higher magnification). Note that there is no evidence of active inflammation or any indication of bacterial activity.

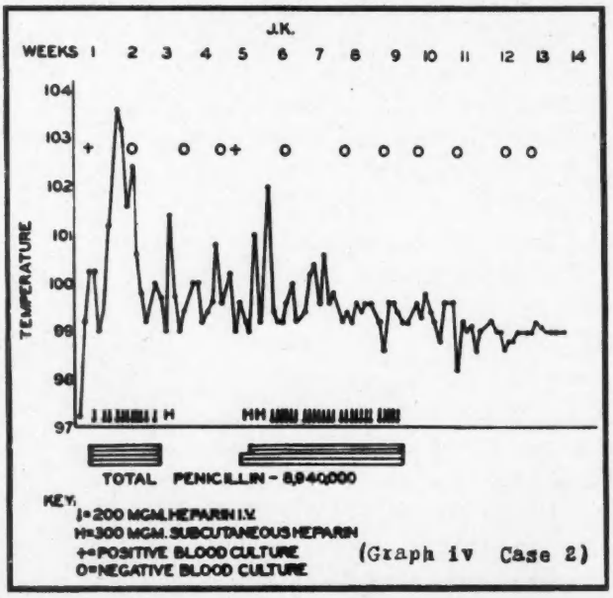
scriptions of the heart valve as recorded in one instance by Dr. E. S. Maxwell of the Good Samaritan Hospital in Sterling, Kentucky, and in the other by Drs. J. W. Denton and A. F. Heyl of the New Rochelle Hospital.

CASE 1

N.M. (Graph III), aged 29, female. Subacute bacterial endocarditis, 12 weeks; *Streptococcus viridans* (penicillin sensitivity 0.031 O.U.): chronic rheumatic cardiovalvular disease, aortic; aphasic on admission due to cerebral embolus; responded well to one 23-day course of penicillin-heparin therapy; developed intractable congestive heart failure which resisted all therapy; blood stream sterile for more than six months until death. Dr. Maxwell reports that the right aortic cusp was almost completely destroyed and replaced by short fibrotic stubs. A congenital aneurysm was present near the origin of the aorta. It was Dr. Maxwell's opinion that death was due to cardiac failure with marked visceral passive congestion. Histological study showed fibrosis and hyalinization of the aortic stubs with no evidence of bacterial inflammation (Figs. 1 and 2).

CASE 2

J.K. (Graph IV), aged 33, female. Subacute bacterial endocarditis, 28 weeks; *Streptococcus viridans*; chronic rheumatic cardiovalvular disease, aortic and mitral; two courses of penicillin-heparin therapy, 14 and 28 days respectively; discharged from hospital in mild congestive heart failure which progressed unfavourably, clinical behaviour same as Case 1; blood stream sterile for more than three months until death. In this case, autopsied by Drs. Denton and Heyl, they reported that there was a shredded, partially calcified anterior cusp of the aortic valve with marked insufficiency of the orifice. The heart was hypertrophied and dilated. There was severe chronic passive congestion of the viscera. It was the opinion of the pathologist that death was due to congestive heart failure and there were no histological evidences of active bacterial endocarditis (Figs. 3 and 4).



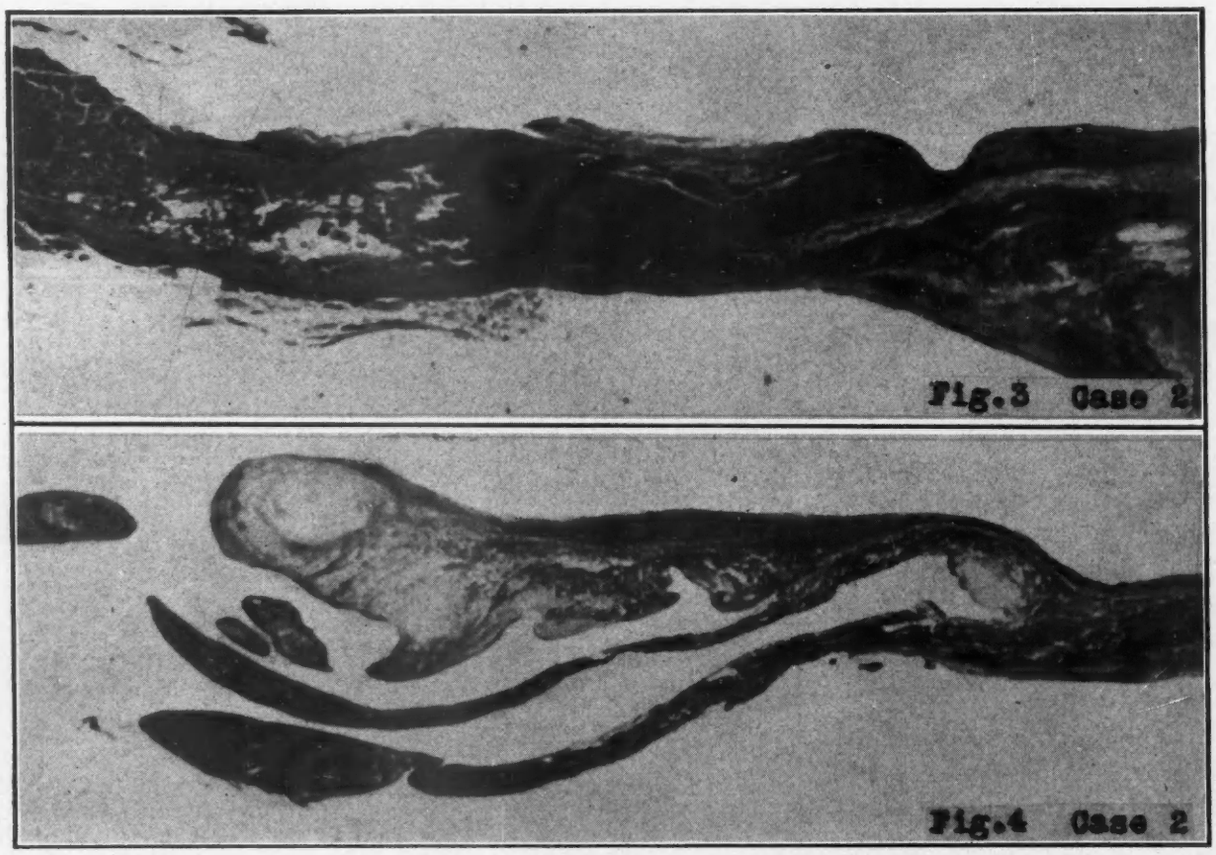


Fig. 3.—Aortic valve. Note the dense fibrotic character of the stroma and central fragmentation of the connective tissue. Note that the surfaces are completely endothelialized. **Fig. 4.**—Mitral valve nodule. Note composition of moderately cellular fibrous tissue. There is no evidence of active inflammatory change.

Interpretation of autopsy findings and the evaluation of gross pathological phenomena invite a discussion also of the significance of embolization occurring during the course of treatment. It is a well-established fact that embolization is a common complication of subacute bacterial endocarditis, but embolization has also been attributed to heparinization, particularly in the presence of thrombotic vegetations on the heart valves. To clarify this point, we have charted (Table VII) the relationship of embolization to therapy in eight of our patients. In four, embolic phenomena were present

TABLE VII.
GROSS EMBOLIC INVOLVEMENT OF THE CENTRAL NERVOUS SYSTEM

Time of occurrence with respect to penicillin-heparin therapy	*No. of cases*	*Successfully treated*	*Fatal outcome*
Before treatment	4	4	
During treatment	3		3
After completion of treatment	1	1	
Total	8	5	3

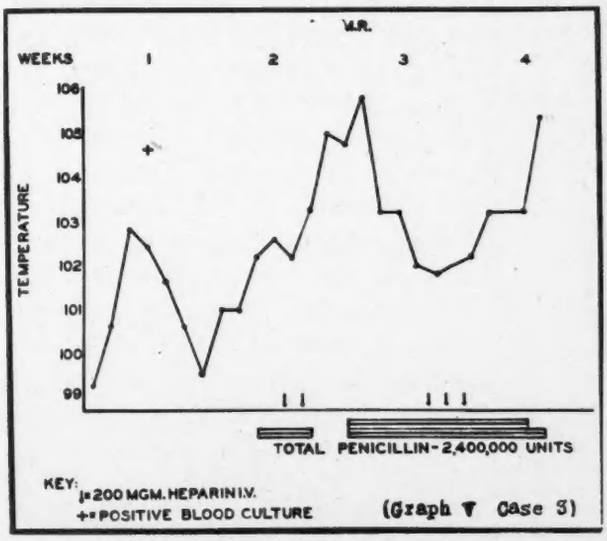
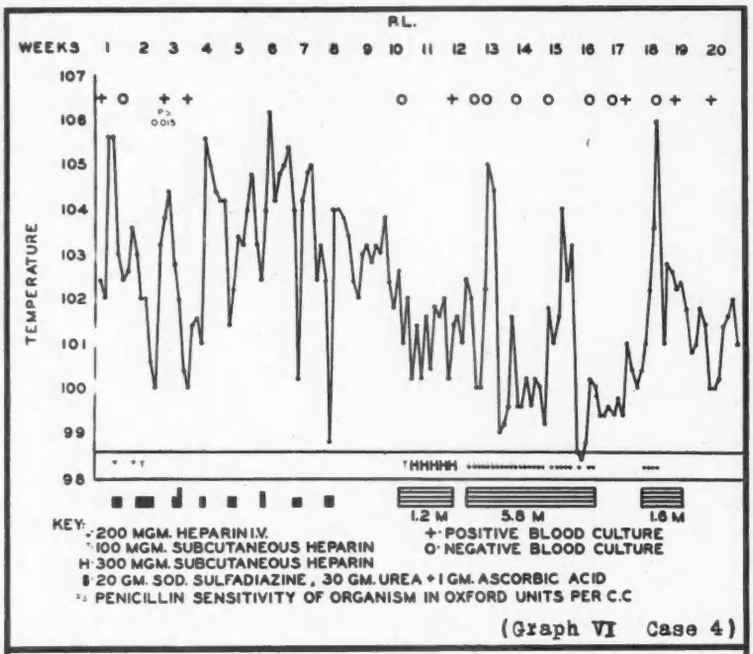
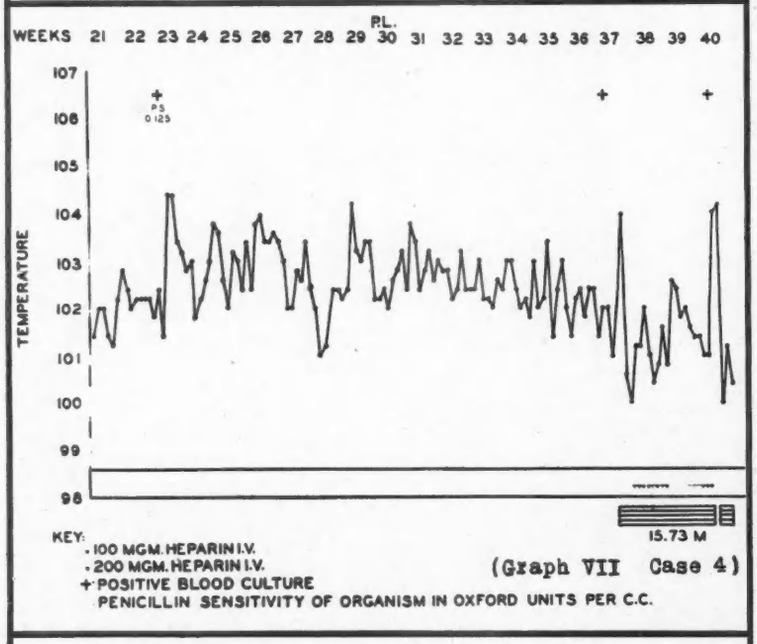


Fig. 5.—Aneurysm of sinus of Valsalva viewed from above. Note severe ulcerative lesion.

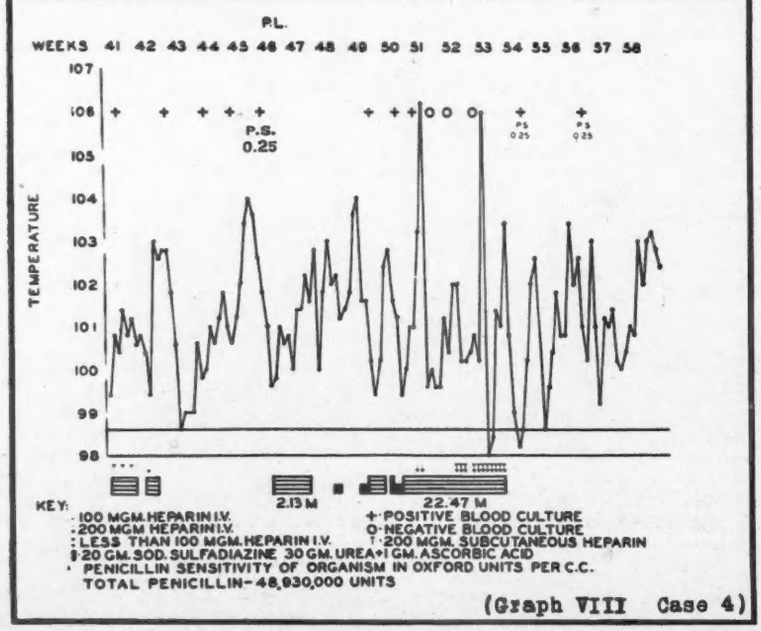
Fig. 6.—Aortic and mitral thrombo-ulcerative endocarditis. Note extensive myomalacia cordis, especially on cut surface. **Fig. 7.**—Myomalacia cordis. Gross fragmentation of myocardium.



(Graph VI Case 4)



(Graph VII Case 4)



(Graph VIII Case 4)

before the inauguration of treatment and four of these patients were successfully treated. Three patients in the first 30 of the series of 54 cases had embolization during treatment and succumbed. These are included among the treatment failures.

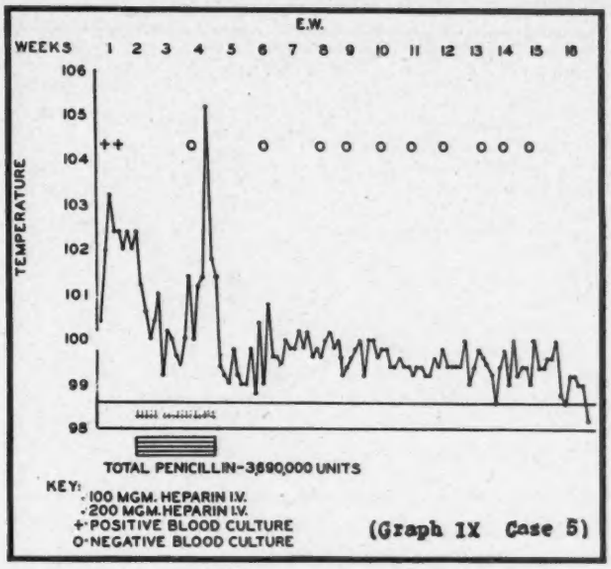
It may be more than fortuitous that, since introducing a probationary 3-day course of intramuscular penicillin treatment, there has been no intra-therapy cerebral embolization. In only one instance has there been a post-therapy embolization and that occurred in a patient who made a splendid recovery both from the infection and from the hemiplegia which resulted from the vascular occlusion. From these figures it would seem fair to conclude that pre-treatment embolization is not a contra-indication to the inauguration of anticoagulant, anti-infective therapy and that embolization occurring during and following treatment is more likely a manifestation of the continued progress of the underlying disease than a result of the utilization of the anticoagulant.

SATISFACTORY RESULTS

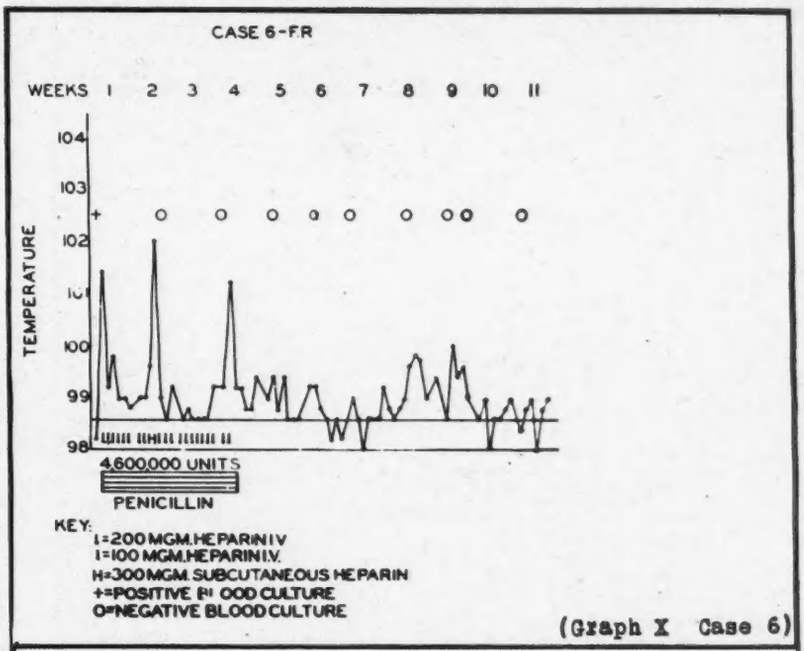
We have recorded satisfactory results in 40 patients, of whom 37 are still alive, many having resumed their normal activities. The most recent patient has been observed for only two months, but the oldest member of the group was discharged from the hospital fifteen months ago. In the favourable instance, the temperature falls to a normal level, the patient experiences a sense of well-being though, naturally, the mechanical deformities of the heart valves result in varying degrees of diminution in cardiac reserve. As in the instance of fatalities and treatment failures, the outcome of therapy is dependent upon patient- and organism-factors. Those patients who are seen soon after the onset of their bacteræmia, who have relatively small vegetations, who do not suffer from ulcerative endocarditis or circulatory failure have the optimum chance for cure,

provided that their infection is by a penicillin-sensitive organism.

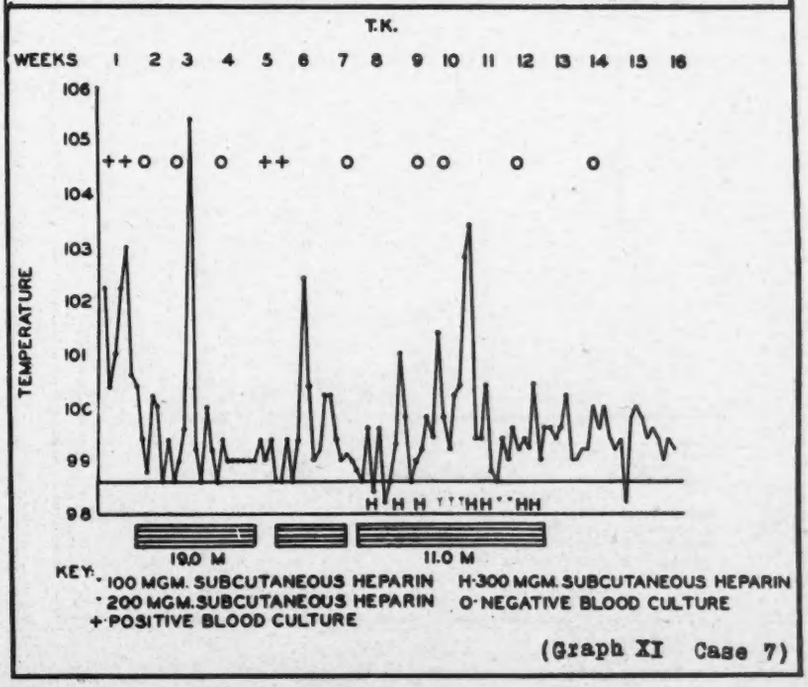
The second variable, so clearly delineated by Prof. Sherman's studies (Table VI), deals with the variety of infecting organisms. Apparently, infection with streptococcus mitis or bovis carries a considerably more favourable prognosis than an invasion caused by the special streptococcus which is presently being subjected to searching inquiry by Prof. Sherman. The accomplishment of a favourable outcome in approximately 3 out of every 4 patients leaves no doubt that the beneficial results observed in this unselected series cannot be attributed to spontaneous recovery. The severity of the manifestations of the disease in our group of patients precludes the possibility that we have been dealing with the bacteria-free stage of the subacute streptococcus endocarditis syndrome.



(Graph IX Case 5)



(Graph X Case 6)



(Graph XI Case 7)

PROPHYLAXIS

Consistent with Dr. Libman's observation concerning the possible portal of entry in the upper respiratory passages and the teeth, we have included in our treatment program the elimination of foci of infection before permitting the patient to leave the hospital. To prevent a recurrence of exacerbation of the bacteræmia, penicillin is administered parenterally and topically before and after the eradication of the focus.

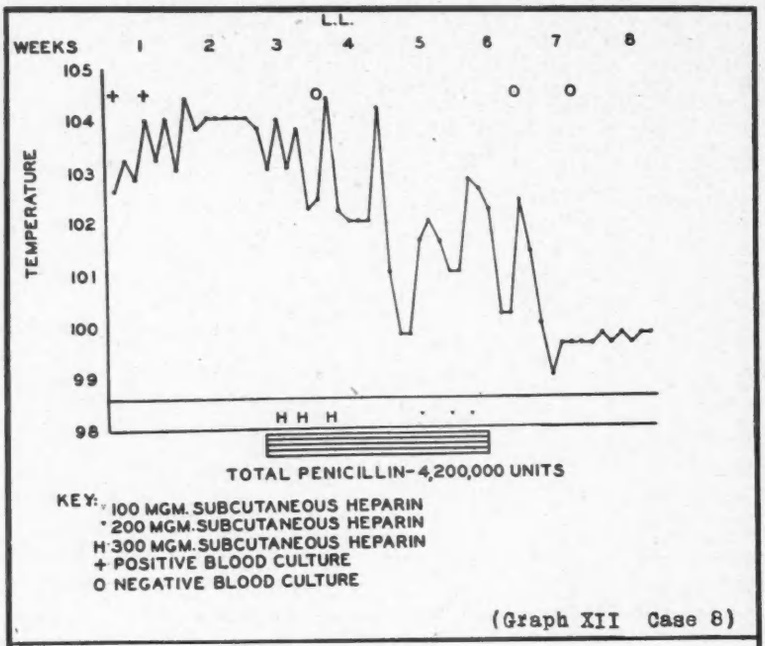
In the time that remains, it may be possible to illustrate the general principles which have been established through a concrete study of individual case records.

A. ANALYSIS OF FAILURE

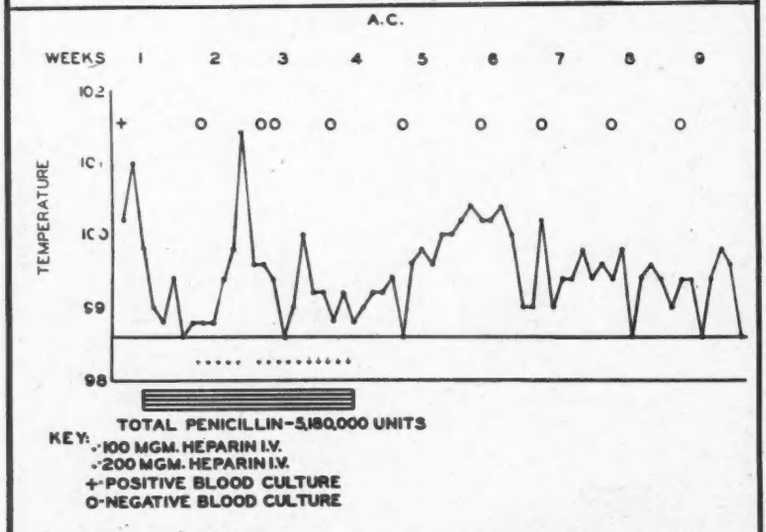
1. *Example of therapeutic failure due to patient factors.*

CASE 3

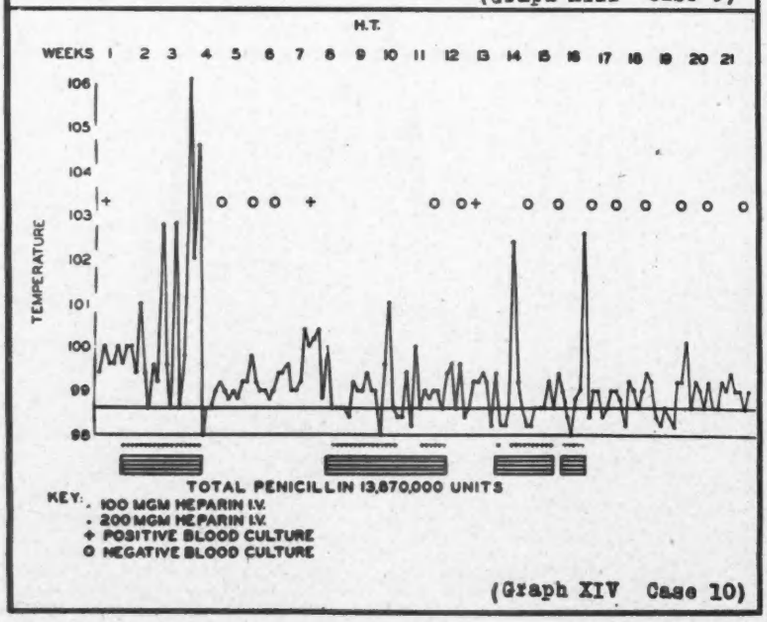
M.R. (Graph V), aged 47, male. Subacute bacterial endocarditis, 6 weeks; *Streptococcus viridans;* chronic rheumatic cardiovalvular disease, aortic and mitral; discontinuous therapy for 12 days, severe myocardial embarrassment, pulmonary and cerebral embolization; progressive downhill course, death from circulatory failure (Figs. 5, 6, and 7).



(Graph XII Case 8)



(Graph XIII Case 9)



(Graph XIV Case 10)

2. *Example of failure due to organism factor. Infection with Streptococcus sp. (Table VI) which acquired resistance to penicillin.*

CASE 4

P.L. (Graphs VI, VII, and VIII), aged 21, male. Subacute bacterial endocarditis; 56 weeks; *streptococcus viridans,* (penicillin sensitivity 0.015 to 0.25 O.U.): chronic rheumatic cardiovalvular disease, aortic and mitral; three courses of penicillin-heparin therapy with but temporary improvement; treatment suspended October 31, 1943, for lack of material; resumed four months later with intensive massive medication; therapy interrupted because of extra-cardiac complications which caused death despite total of 48,930,000 Oxford units given in six courses; organisms recovered after successive courses displayed increasing resistance to penicillin as shown in laboratory assays and reflected by the lack of clinical response; confirmatory autopsy findings were, "thrombo-ulcerative mitral and aortic endocarditis, with lesions predominantly aortic. Valve stenotic and insufficient. Chronic cardiac failure with accumulation of fluid in body cavities and passive congestion of viscera. Death due to ruptured œsophageal varices. Long-standing case with resistant organism".

B. Co-existent Rheumatic Virus Activity

Penicillin-treated patients are apparently susceptible to virus infections, due probably to disturbance of protective barriers by the drug. Reactivation of rheumatic virus in successfully treated patients with subacute bacterial endocarditis may be explained on the same basis.

CASE 5

E.W. (Graph IX), aged 16, female. Subacute bacterial endocarditis; 8 weeks; *Streptococcus viridans,* (penicillin sensitivity 0.015 O.U.); chronic rheumatic cardiovalvular disease, aortic and mitral; one 17-day course of penicillin-heparin therapy sterilized blood stream; continued low grade temperature and elevated ESR, post-therapy, due to persistent rheumatic virus activity uncovered by successful therapy of subacute bacterial endocarditis; confirmatory electrocardiographic findings of protracted rheumatic virus activity; culmination in severe rheumatic pericarditis with effusion six months post-therapy; development of hydro-pneumopericardium and its subsequent disappearance portrayed radiographically; despite all this no recurrence of bacterial endocarditis; blood stream sterile for over nine months; weight gain of 14 pounds, hæmoglobin 82%, ESR 40 mm./hr.; continued active rheumatic suspect.

It was an interesting observation to note that the rheumatic virus continued to operate despite the

presence of sufficiently high penicillin levels to eliminate streptococcal viridans bacteræmia. This and kindred observations tend to point up the recently reported experiences of the Army and Navy[6, 7] which attest to the resistance of rheumatic virus to anti-infective agents.

C. Failure with Penicillin Alone—Success with Combined Penicillin-Heparin. Seven Such Instances to Date

Case 6

F.R. (Graph X), aged 43, female. Subacute bacterial endocarditis, 12 months; *Streptococcus non-hæmolyticus;* chronic rheumatic cardiovalvular disease, aortic and mitral; on continuous intramuscular penicillin therapy for 10 months; totalling almost 9 million units with but transitory sterilization of blood stream; referred for penicillin-heparin therapy; one course interrupted after 3 weeks because of apparent penicillin-heparin sensitivity; striking progressive clinical improvement; no clinical or laboratory evidence of bacterial activity for over 10 months despite complicating upper respiratory infection; prophylactic oral surgery.

Case 7

T.K. (Graph XI), aged 22, male. Subacute bacterial endocarditis, 3 weeks; *Streptococcus viridans,* (penicillin sensitivity 0.03 O.U.); patent ductus arteriosus; recovery from subacute bacterial endocarditis two years ago following sulfonamide-fever therapy; two courses of penicillin *per se,* totalling 19 million Oxford units, ineffective for present recurrence; one five-week cycle of penicillin-heparin, with lower dosage of penicillin, successful; no clinical or laboratory evidence of bacterial activity for over 2 months.

D. Comparative Response of Patients to Therapy

Case 8

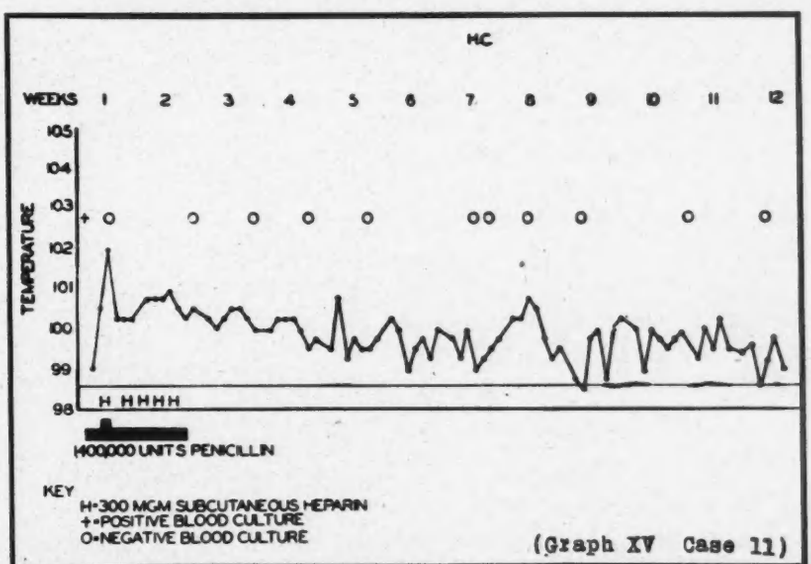
L.L. (Graph XII), aged 33, female. Mt. Sinai Hospital (courtesy of Dr. B. S. Oppenheimer). Subacute bacterial endocarditis, 8 weeks; *Streptococcus viridans,* (penicillin sensitivity 0.03 O.U.); chronic rheumatic cardiovalvular disease, mitral; stormy course characterized by rigors, spiking temperature; continuous intravenous medication impossible because of congestive heart failure necessitating dehydration measures; temperature immediately post-therapy ascribed to rheumatic virus activity, prompt response to salicylate therapy; infected dental foci removed; no clinical or laboratory evidence of bacterial activity for over 7 months; present weight 124 pounds, hæmoglobin 80%; ESR 7 mm./hr.

Case 9

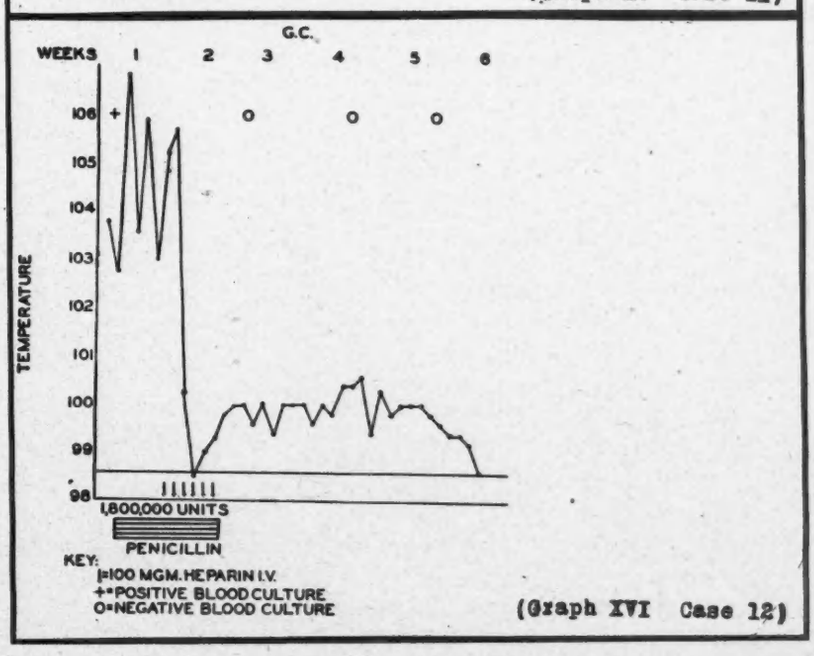
A.C. (Graph XIII), aged 59, male. Subacute bacterial endocarditis, three weeks, *Streptococcus viridans,* (penicillin sensitivity 0.06 O.U.); chronic rheumatic cardiovalvular disease, mitral; therapy well tolerated; uneventful course apart from regional lymphangitis; no clinical or laboratory evidence of bacterial activity for over 5 months; prophylactic oral surgery.

Case 10

H.T. (Graph XIV), aged 27, male. Subacute bacterial endocarditis, 24 weeks; *Streptococcus viridans,* (penicillin sensitivity 0.06 O.U.); chronic rheumatic cardiovalvular disease, aortic and mitral; intensive sulfonamide therapy ineffective, admitted for penicillin-heparin therapy; advanced case, deteriorated, glomerulonephritis, hæmoglobin 45%; marked febrile response after 14 days' therapy; widespread simultaneous embolization to brain, lungs, spleen and kidneys due apparently to fragmentation of vegetations; prompt cessation of embolic phenomena and abrupt defervescence following suspension of therapy after 17 days; second and third courses of penicillin and heparin well tolerated; compare penicillin requirements with previous cases; progressive clinical improvement; no clinical or laboratory evidence of bacterial activity for over 6 months; renal findings negative; prophylactic oral surgery; weight gain of 28 pounds, present hæmoglobin 98%, ESR 6 mm./hr.



(Graph XV Case 11)



(Graph XVI Case 12)

CASE 11

H.C. (Graph XV), aged 52, female. Case 6 of original series;[8] subacute bacterial endocarditis, *Streptococcus hæmolyticus*, 3 weeks; chronic rheumatic cardiovalvular disease, aortic; widespread, almost lethal embolizations; prompt, dramatic response to penicillin-heparin therapy; progressive clinical improvement, and negative blood cultures, 14 months; present weight 163 pounds, hæmoglobin 94%, ESR 7 mm./hr.; has resumed work as a private secretary for past six months.

CASE 12

G.C. (Graph XVI), aged 10½, male. Pneumococcus-type 33 endocarditis referred by Dr. Robert E. Gross of Boston for sterilization of the blood stream prior to operation on a patent ductus arteriosus; ill with chills and fever for 3 weeks prior to admission; no response to sulfonamides; progressed favourably following a short course of therapy and was sent home clinically well; temperature chart shows graphically the spectacular response; hyperpyrexia attributed to overwhelming destruction of organisms and consequent liberation of bacterial proteins; when last seen over nine months post-therapy gained 23 pounds, hæmoglobin 104% and ESR mm./hr.

CONCLUSIONS

A review of these illustrative cases permits of the following conclusions:

1. Age and sex have no bearing on the outcome of therapy.

2. The type of organism, apart from the so-called *Streptococcus sp.* (Table VI), is immaterial to the outcome of therapy, provided it is inhibitable by penicillin within practical limits (0.007 to 0.125 Oxford units).

3. If the patient is in good physical condition, the duration of the disease less than three months, and the causative organism sensitive to penicillin, a satisfactory result may be anticipated, barring accidents, in virtually every case.

The invitation to deliver the Seventh Louis Gross Memorial Lecture has been a source of tremendous personal satisfaction to me. I should be remiss however, were I to conclude without expressing my thanks to my various colleagues and collaborators, among whom are included Drs. P. Rosenblatt, M. Lederer, H. J. Greene, M. D. Levin, M. Grolnick, and E. Alture-Werber, Mr. M. Russell, and Misses R. Kashdan and M. Koslof. I would like also to express my gratitude to Dr. Harold T. Hyman for his invaluable assistance in the correlation of my data for presentation.

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MANAGEMENT OF BREAST TUMOURS*

By Roy D. McClure, M.D. and Laurence S. Fallis, M.D.

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SO well spread has been the information by the various societies organized for the control of malignant disease that many patients now consult their medical adviser for assurance that they do *not* suffer from cancer. The breast is the organ for which advice is sought most frequently because of the relative ease with which changes in texture can be recognized by self-examination. Women who discover a lump in their breast almost universally fear that they have a cancer. These women pursue two divergent courses. One small and fortunately diminishing group, because they feel that there is some stigma attached to cancer, pretend to ignore such a lump. Perhaps this is due to fear and an inability to face the issue. By far the majority of women, however, visit their doctor without much delay; though at the same time it is of the utmost importance never to make an all-out diagnosis of carcinoma, but always to leave the patient with at least a ray of hope that the condition may not be malignant.

The thought uppermost in these patients' minds is: Do I have cancer? Except in the moderately or far advanced cases a definite answer cannot be given. Because these women are at least thinking of the term cancer, if not actually using it, no useful purpose can be served, and much harm may be done by failure of the medical man to discuss the condition quite openly and frankly. We have picked up many unsuspected early cancers of the breast in our diagnostic clinic annual examinations where the patient had felt no lump themselves. Of course there are patients whose mental make-up is such that given a diagnosis of suspected cancer they would be thrown into a state of depression, but these are relatively rare, and easily recognized. Well-meaning relatives in many instances create embarrassing situations for the doctor by requesting that the patient should not be told the truth if cancer is present. Time spent in pointing out the error of this course of procedure to relatives, and convincing them that the

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medical attendant is the best judge of what to tell the patient, will often pay big dividends.

A good answer to the average patient's question of—Is it a cancer?, is, that it could be. Then we point out the difficulty or impossibility of making a diagnosis in doubtful cases, at the same time emphasizing the ease with which a definite opinion can be given in an advanced case. Next is stressed the advantage of biopsy, pointing out that microscopic examination is the final court of appeal from a diagnostic standpoint, and that in early malignancy it may bear the same relation to clinical impression as does fact to fancy. Thus, in patients with definite malignant disease, the impression will be created that the doctor does not consider their case hopeless, nor that they let it go too far before seeking advice.

It is extremely important to embark upon the program without delay once it has been accepted by the patient and her family, for it is the uncertainty that is responsible for the mental turmoil of these harassed individuals. Truly remarkable is the peace of mind that descends on these patients as soon as treatment is under way, and how little it is disturbed by positive biopsy and radical mastectomy.

Examination of the Breasts

The patient should be completely undraped above the waist, and the examination should be conducted in both the erect and recumbent positions. The breasts should first be inspected with the patient sitting upright. The relative size and level of nipple, bulgings, retraction of skin or nipple, pigskin effect, should be noted. Next, with the patient lying flat, the same points should be observed and carefully recorded, for if operation is not performed immediately, such a record is essential for study in subsequent examinations. Both breasts and both axillæ require investigation, beginning preferably with the unaffected side. Palpation of the entire breast with the tips of the fingers, followed by compression of the breast against the chest wall with the palm of the hand is of value in differentiating true tumour formation from normal breast tissue. Next is the routine palpation of the supraclavicular region, though fortunately we do not see the advanced cases with enlarged glands above the clavicle since education has made women so conscious of the dangers of delay. Examination of the axilla is facilitated by having an assistant support the patient's arm to relieve tension on the fascial floor. There may be a 25% error in evaluating axillary lymph nodes, for about one-quarter of enlarged lymph nodes will show no evidence of metastatic malignancy on microscopic examination. In an equal number of patients metastatic axillary involvement will be revealed by the microscope when the enlargement is not recognized clinically. Transillumination should be routinely employed, since it is often of value in distinguishing solid from cystic tumours. The investigation is not complete without palpation of the liver border for enlargement and nodules, and x-rays of the chest is our normal procedure in the search for metastases to lungs, ribs, or spine.

In this paper it is proposed to approach the problem of breast lesions from a practical or purely clinical standpoint rather than from a consideration of detailed pathological classification. Tumours of the breast, as they are seen in the doctor's office or in the outpatient department usually fall into one of four groups, *viz.*, fibro-adenoma, chronic cystic mastitis, intraductal papilloma, and carcinoma. Other less frequently encountered breast lesions such as caked breast, traumatic mastitis as in the basis of fat necrosis, and the acute and chronic infections of the breast, will be mentioned because of their bearing on the differential diagnosis of carcinoma.

Fibro-Adenoma

This is the commonest of the benign solid growths and is usually a single lesion. It is predominately a tumour found in girls and young women, for fully 75% appear before the age of thirty. Characteristic features of these tumours are a well-defined margin, and a high degree of mobility. Although often deeply placed in the breast tissue, the tumour is easily palpated, and often is elusive as it slips from under the palpating finger. No other breast tumour possesses quite this degree of mobility. Their size seldom exceeds that of a walnut. Formerly when operations were avoided, fibro-adenomata were the largest of all breast tumours and weights up to forty pounds have been recorded. Since these growths are made up of both fibrous and epithelial elements, the former predominating, sarcomatous and carcinomatous degeneration may supervene. Benign cystic degeneration also occurs.

Treatment.—Removal is advisable in all cases, because of the potential danger of these tumours and most of all because of the uncertainty that always exists even in the hands of the most skilled diagnostician.

CHRONIC CYSTIC MASTITIS

The influence of ovarian hormones in the breast is manifested by the tissue changes which are affected during puberty, pregnancy, lactation, and following the menopause. Two ovarian hormones influenced by the anterior pituitary appear to regulate these breast changes, the follicular hormone controls the connective tissue elements, and the corpus luteum hormone controls the duct and acinar tissues. The breast from infancy to old age is continuously undergoing changes of either hyperplasia or involution. Minor disturbances resulting in hormonal imbalance produce alterations in the breast that are recognized clinically as chronic cystic mastitis.

Though this disease has many pathological variations its importance from a practical standpoint is that it produces lumps in the breast that can be felt by the patient, and that its differentiation from carcinoma presents one of the greatest problems to the practising physician. We have had three cases during the past winter which came to the operating table with the diagnosis of chronic cystic mastitis. Fortunately, biopsy was done in each case and when cancer was reported, immediate radical amputation was done. We prided ourselves that we could tell the diagnosis from gross section, but in one of these cases the wound was closed when the pathologist reported cancer.

Chronic cystic mastitis is a disease of the second and third menstrual decade, *i.e.*, between the ages of twenty-five and forty-five. Unmarried women and married women who have not borne children are more commonly affected than are parous women. Unlike carcinoma, pain often is the feature that draws the patient's attention to her breast, resulting in discovery of a lump or lumps. The pain is rarely severe, is often aggravated by movement of the arms, and is usually more prominent during the menstrual period. Both breasts are commonly involved, though the disease may be limited to one breast or even a single quadrant. When the patient is first seen, it is chronic cystic mastitis that presents the greatest diagnostic problems. Just as the extent of involvement of the breast varies, so does the degree which ranges from simple thickening of the tissues or mild lumpiness of the breast to large cysts which involve almost the entire breast. The usual findings however, are the intermediate grades where multiple discrete, small cysts or conglomerate medium sized cysts may be palpated. When seen at operation or section, they appear as "blue-dome cysts".

Relationship to cancer.—This is one of the most controversial subjects in the field of cancer. Opinions vary widely from those of Cheatle and Cutler who assert that chronic cystic mastitis is the precursor of carcinoma in 20% of patients, to those who maintain that the association of the two conditions is only coincidental. Statistical evidence, as Shields Warren points out, is of little value unless the values are corrected for age groups, general incidence of breast cancer in the community, etc. At the Henry Ford Hospital a five-year follow-up on 149 patients with chronic cystic mastitis who had been subjected to biopsy to exclude carcinoma, revealed that not a single one of these patients developed breast cancer in the period under observation. Contrast this with our three positive cases of this. In evaluating this observation, Dr. Frank W. Hartman, our pathologist, points out that it is not the patients with large blue-domed cysts who go on to develop carcinoma, but that malignant disease supervenes in those cases of chronic cystic mastitis in which epithelial hyperplasia predominates, such as takes place in the development of intraductal papillomas or cysts with papillary epithelium. This may well explain the failure to demonstrate the relationship between the two diseases in our own cases, for it is the patient with the cystic mass that seeks advice, and is subjected to biopsy, while the more potentially dangerous hyperplastic lesion may escape detection. The present day accepted concept is that there is a very definite relationship between chronic cystic mastitis and carcinoma.

Clinical differentiation from carcinoma.—Pain is the symptom that is likely to attract the patient's attention to the breast in chronic cystic mastitis, while in carcinoma the lump is usually discovered by the patient while bathing. Chronic cystic mastitis usually involves both breasts, while in carcinoma only one breast is involved as a rule. Lumps in both breasts favour a diagnosis of chronic mastitis. The majority of pa-

tients with chronic cystic mastitis are in the age group 25 to 40, whereas almost 75% of patients with carcinoma of the breast are over 50 years of age. Chronic cystic mastitis is more common in the nulliparous than in the parous woman, but the reverse is true of carcinoma of the breast.

Treatment.—The problem of management of a patient with chronic cystic mastitis is one that must be squarely faced by the family physician, the consultant, and the surgeon alike. There is no evading the issue; a decision must be made. After due appraisal of the condition and before proffering advice it is well to keep in mind the fact that the real reason for the patient's visit is not so much to see about the lump as to find out if she has cancer. It is thus clearly the duty of the medical attendant to advise biopsy in all doubtful cases, and most of them are doubtful, and to protect himself and his patient by suggesting a second opinion in cases not submitted to biopsy even if he feels that the diagnosis of chronic cystic mastitis is reasonably certain. We have seen too many patients perish from the watching-waiting policy. Patients whose lesions are not biopsied should be instructed to return for examination at regular intervals not exceeding six months. Be particularly careful to avoid too much optimism in discussing negative biopsies since usually only one segment of the breast has been examined. Never dismiss these patients with too much assurance that everything will be all right, for they too require continued supervision. The practice of removing the entire breast because of the possible development of malignancy should be condemned, though simple mastectomy is occasionally indicated. In this case, when a patient has had two or three operations during the period of years for chronic cystic mastitis, the request to remove the entire breast or both breasts should be seriously considered and it is our practice, with the very lumpy breast of chronic cystic mastitis, to remove either one or both breasts.

DUCT PAPILLOMA

Duct papilloma is characterized clinically by discharge from the nipple. This discharge, often the only symptom, is blood-stained, an observation that sends the patient hurrying to the doctor, because of the fear of cancer. These tumours arise in the wall of the duct or of a cystic dilatation, and when single usually are situated just beneath the areola. Multiple tumours occur in about 25% of cases according to Cheatle and Cutler. These tumours usually remain small and can only rarely be detected on palpation, though pressure in the areolar area will often produce the characteristic nipple discharge. About 5% become malignant.

Treatment.—Local dissection of the subareolar tissue and removal of the papilloma for biopsy is permissible when there is no tumour formation, or evidence of breast tissue abnormality. But when the breast is nodular, simple mastectomy is definitely indicated, to be followed by radical dissection of the axilla and chest wall if there is any evidence of malignancy on microscopic examination.

INFECTION OF THE BREAST

Acute infections often subside, but may go on to abscess formation. Suppuration in the breast is indicated by induration plus enlarged tender axillary lymph nodes.

Treatment is by early operation. Incision and drainage should not be delayed until pointing of the abscess occurs. The tendency to loculation should not be overlooked.

Chronic infections of the breast include gumma, tuberculosis, actinomycosis, and untreated pyogenic infections. They are all characterized by multiple sinus formation.

Treatment.—The underlying etiological factor must receive adequate treatment before embarking on local measures, which consist of segmented resection when the lesions are small and isolated, and simple mastectomy when the major portion of the breast is invaded.

CARCINOMA OF THE BREAST

It is most unfortunate that there are no early subjective symptoms of carcinoma of the breast. Objectively, any alteration in texture of the breast should arouse suspicion of malignancy, but is so far advanced that the diagnosis is obvious. When cancer of the breast is recognized on the basis of the classical features of hard lump, fixation, nipple retraction, skin changes, and enlarged axillary lymph nodes, the chance of permanent cure has almost vanished, though life may be prolonged by radical surgery and well-controlled roentgen ray therapy. Acute carcinoma often presents a difficult diagnostic problem. Here the growth is so rapid and the enlargement of the breast so pronounced that the appearance of acute inflammation is pro-

duced. Life is usually of less than six months' duration in these cases. At the other end of the pathological picture is the atrophic scirrhous carcinoma where growth is so slow that the elderly patient succumbs from some other condition. Patients have been known to survive this condition for over fifteen years, even when untreated.

Carcinoma *en cuirasse* is another type of cancer of special interest. The subcutaneous lymphatics are invaded in this variety, so that the skin is apt to be greatly thickened over the entire involved area. In time the process spreads in a centrifugal fashion over wider areas. Nodules appear along the course of the lymphatics, often extending around to the back.

Treatment. — Radical mastectomy following the principles laid down by Halsted should be performed in all cases of carcinoma of the breast, with few exceptions. Simple mastectomy is indicated only when the general condition of the patient precludes the radical procedure, or as a purely palliative procedure in hopeless cases. Even patients with fungating far-advanced growths should have the benefit of simple mastectomy, for the relief to these patients and their relatives is immeasurable.

X-Ray Therapy

It is generally agreed that x-ray treatment is a useful adjunct to radical surgery in the management of cancer of the breast. In our study several years ago we compared one group of radical mastectomy patients who had had deep x-ray treatments following operation, with another similar group, who had no x-ray treatments. There was no significant difference in the end results. It has been difficult to produce statistical evidence in favour of the use of x-ray therapy because of the diverse factors involved in any given group of cases. The type of tumour, its gradation, involvement of the skin, presence of metastases, age of the patient, etc., have all to be considered in assessing the value of any treatment. X-ray irradiation probably has its greatest rôle in the treatment of metastases; especially noteworthy is its pain-relieving capacities. The excellent response of certain metastatic nodules to x-ray therapy provides a firm basis for advising the prophylactic use of x-rays after radical mastectomy. It must be agreed that even after a thorough radical operation nests of malignant cells are sometimes left because of their inaccessibility. If these cells are radiosensitive it is logical to assume that the use of adequate x-ray irradiation postoperatively might cure some patients who would otherwise be lost. The use of x-ray treatments preoperatively may be of value, but there are two drawbacks; first, there is delay in extirpating the primary growth, and second, improvement may be so pronounced after such treatment that the patient will refuse the radical operation.

Etiology

It is hard for me to believe that trauma plays any rôle in cancer of the breast. Never have I seen cancer develop following cutting, clamping or tying of breast tissue in hundreds of operations for benign breast tumours.

Prognosis

The operative mortality in large series of cases averages around 2%. Pulmonary embolism and myocardial failure account for most of the fatalities. Death from either shock or sepsis is extremely rare. For purposes of estimating prognosis it is customary to divide the cases in three groups:

Group I.—The disease is confined to the breast. Five-year survival in this group is obtained in approximately 75%.

Group II.—The skin over the tumour and/or the inferior axillary nodes are involved. This group gives a 30% five-year survival.

Group III.—The chest wall is invaded, the supraclavicular and high axillary nodes show evidence of metastasis or distant metastases are present. Only rarely will it be possible to prolong the life of a Group III patient for as long as five years, but this has occasionally been done in patients with radiosensitive tumours.

It is apparent then that the number of five-year survivals can be increased only by earlier institution of radical treatment. This state of affairs can be brought about only when everyone above the age of thirty-five undergoes at least yearly complete physical examinations, and practising physicians adopt the principle of assuming that all lumps in the breast are malignant until proved negative by biopsy.

Biopsy in Suspicious Cases

All patients on whom a biopsy of the breast is projected should be prepared for a radical operation. These arrangements include: (1) Frank discussion of the problem and its potentialities with the patient's nearest relative. (2)

Preparation of the patient mentally by explaining to her that removal of the entire breast may be necessary. (3) The use of a general anæsthetic. (4) Draping the patient for radical operation. (5) The presence of a pathologist prepared to make a frozen tissue section. (6) Grouping and cross agglutination of the patient's blood with either bank blood or with immediately available donor. (7) Making arrangements for possible skin graft by preparing donor site and having available suitable instruments.

BIOPSY IN CLINICALLY POSITIVE CASES

Biopsy should be done in the majority of instances before proceeding with the radical operation. With the exception of far-advanced cases, clinical examination of the breast is at best a guessing contest, since small freely movable single nodules presenting none of the classic clinical signs so frequently show early malignant changes, and the fixation of large nodules is not infrequently due to inflammatory changes in a cyst. It is obvious that one is not justified in offering an opinion, much less embarking on a radical surgical procedure, without evidence based on microscopical examination. In obtaining the specimen for biopsy, the tissue removed should include the lump under suspicion plus a wide area of surrounding breast tissue. This avoids cutting through possible malignant extensions and provides the pathologist with adequate tissue for both gross and microscopic examination.

SUMMARY AND CONCLUSIONS

1. Most women who complain of a lump in the breast are "cancer conscious".
2. The commonest breast tumours are fibroadenoma, chronic cystic mastitis, and carcinoma.
3. When carcinoma of the breast can be diagnosed clinically the prospect of cure is not great.
4. All lumps in the breast should be considered as being malignant, until proved otherwise.
5. Early detection of the disease can be accomplished only by periodic physical examination in all patients over thirty-five years of age.
6. Conservative treatment of chronic cystic mastitis is justifiable only after obtaining a biopsy.
7. When biopsy is projected, the patient should be prepared mentally and in the operating room for a possible radical mastectomy.

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THE BACTERIOLOGY OF AN EPIDEMIC OF STAPHYLOCOCCAL FOOD POISONING

By Capt. P. S. Rutherford and Lieut. C. N. Crowson, R.C.A.M.C.

AN epidemic of abdominal cramps, vomiting and diarrhœa occurred among the personnel of an army unit on the West Coast on the evening of July 28, 1944. The symptoms began within a five-hour period following the evening meal. Fifty-one men were admitted to Shaughnessy Hospital, 46 of whom returned to duty the following morning; all recovered within three days of the onset of symptoms. All cases of illness occurred among men who ate in one mess hall, where the evening meal consisted of cold boiled ham, cold boiled potatoes, bread and butter, jam, cheese, tea with milk and sugar and chocolate cake. The cold boiled ham was the only food universally consumed by those who were taken ill. The clinical manifestations were characteristic of staphylococcal food poisoning, for which ham is known to be a frequent vehicle.[1]

Samples of the food served in the mess hall where all cases of illness originated were examined in the laboratory of Shaughnessy Hospital, Vancouver. The ham was found to be heavily infected with two strains of hæmolytic, coagulase-positive *Staph. aureus;* and the potatoes to be moderately so infected. The cake and cheese were free from such contamination, as were also meat scrapings taken from a slicing machine used for the cold boiled ham. Cold roast beef and canned corned beef were sliced on the same machine and served to troops in two other mess halls. No cases of food poisoning occurred in these two mess halls, and the meat in each case was found to be free from hæmolytic *Staph. aureus.*

Although five hams were served for three mess halls, only a portion of the men eating in one mess hall became ill. Therefore it seems likely that only one ham was responsible for the outbreak. As the 51 affected men passed consecutively by the kitchen, each received a slice of the contaminated ham, and then proceeded in single file to one mess hall. The ham had been prepared the day previously and was sliced just prior to being served at the evening meal. Thus the enterotoxin presumably responsible for the outbreak could not have been elaborated after slicing, but must have been present in the ham before it was sliced. Had the ham and other meats been sliced the day previously on the same machine, the other meats might also have been infected and elaborated enterotoxin; in which case the outbreak might have assumed much larger proportions than it did.

In an effort to determine the source of the infection in the ham, swabs from the nose and throat of 40 cooks and food handlers were cultured on human blood agar. Only seven persons of this group were thus shown to be carrying hæmolytic *Staph. aureus* in their upper respiratory passages. Of these seven cultures, only two were coagulase-positive.

The strains of staphylococci isolated from the ham and potatoes, and the two coagulase-positive strains from the throat swabs of the food handlers, were further examined in the Department of Bacteriology and Preventive Medicine at the University of British Columbia under the direction of Professor C. E. Dolman. On sheep blood agar the ham and potato strains, and one of the throat strains, produced an alpha-toxin type of hæmolysis and no beta-toxin zone; but the other throat strain produced a wide beta-toxin zone. Sterile filtrates were prepared from the first four strains according to the 3½-day room-temperature method recently described by Dolman.[2] Each of these filtrates caused severe vomiting and diarrhœa when injected intravenously in 3 to 5 c.c. amounts into cats, indicating that the strains concerned were all enterotoxigenic.[3] The findings further strengthened the diagnosis of staphylococcal food poisoning. The similarity between the throat and ham strains does not necessarily incriminate the food-handler concerned as the source of contamination, although this finding is suggestive.

A point of further interest developed from an attempt to use the organism isolated from the ham for some studies on penicillin begun during the period. It was found to be resistant to concentrations of penicillin as great as 12.5 Oxford units per c.c. The same organism later developed a rough variant, also resistant to 12.5 units per c.c. From this rough variant, a smooth variant was isolated and found to be resistant to penicillin concentrations greater than 100 units per c.c. This is, to our knowledge, the first recorded instance of a species of *Staph. aureus*, isolated from a natural source, capable of resisting concentrations of penicillin greater than one Oxford unit per c.c. Subsequently, several strains of hæmolytic *Staph. aureus* have been isolated from a variety of sources and found to be non-resistant to dilutions of penicillin containing less than one unit per c.c.

SUMMARY

1. An outbreak of staphylococcal food poisoning due to infected ham is described.

2. The possible source of the infection in the ham was a food-handler who carried an enterotoxin-producing hæmolytic *Staph. aureus* in his nasopharynx.

3. The organism involved was resistant to a concentration of 12.5 Oxford units of penicillin per c.c., and threw off a smooth variant which was resistant to a concentration of 100 units per c.c.

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RÉSUMÉ

En juillet dernier 51 personnes furent victimes, quelque part sur la côte du Pacifique, d'empoisonnement alimentaire à la suite d'ingestion de jambon contaminé par le staphylocoque doré hémolytique. La source de contamination la plus vraisemblable fut attribuée à un porteur de germes, en l'occurence un manipulateur intermédiaire qui abritait dans son naso-pharynx du staphylocoque doré hémolytique; on démontra que ce staphylocoque contenait une entéro-toxine qui déterminait des malaises généraux, des vomissements et de la diarrhée. Cet organisme n'était pas détruit en présence d'une concentration de 12.5 unités Oxford de Pénicilline par c.c. Une variante de culture de ce même organisme ne fut pas détruite par une concentration de 100 unités de Pénicilline par c.c.

JEAN SAUCIER

MEDICAL TREATMENT OF ULCER HÆMORRHAGE*

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A REVIEW of the literature on the subject of hæmorrhage in peptic ulcer disease reveals considerable confusion. Many authors do not state whether or not their cases had *proved* ulcer and many do not give the age groups nor the duration of the ulcer history before the hæmorrhage occurred. Others fail to mention whether the treatment prescribed was started during the hæmorhrage or after it had ceased. For these reasons the results of the therapy under discussion are open to criticism. However, making allowances for possible errors, the mortality rates show that, until recently, treatment was unsatisfactory.

INCIDENCE

It is difficult to estimate the actual incidence of bleeding in peptic ulcer disease because nearly all of the statistical reports refer only to hospital cases. Since most of the bleeding cases are admitted to hospital and only about 20% of all ulcer patients are admitted, it is obvious that hospital percentages will be high in relation to the total ulcer population. The average hospital incidence of bleeding is about 30%. But Collins and Knowlton[1] report an incidence of 3.8% in 2,620 cases of ulcer seen in the Cleveland Clinic which would appear to represent a fair cross-section of general ulcer patients.

In regard to age incidence, it may be said that while hæmorrhages may occur at any age, the great majority happen in the fourth and fifth decades. There are two probable reasons for this: first, the presence of arteriosclerosis in these later groups; and second, the opportunity for a longer duration of the disease with resulting callus formation in the base of the ulcer. One or both of these conditions renders massive hæmorrhage more likely to occur since they interfere with the natural arrest of bleeding.

ESTIMATION OF THE HÆMORRHAGE

We all have seen ulcer patients who have had a small hæmorrhage as evidenced by weakness and tarry stools but have carried on their usual duties and not bothered to report it until later. Such hæmorrhages, in my experience, occur in younger patients with comparatively short ulcer histories. Next in severity is the gross hæmorrhage where the patient has hæmatemesis and melæna but is quickly over it. With such patients, the general condition remains good, the hæmoglobin rarely drops below 60 or 70, the blood pressure, after a preliminary drop, begins to improve in a few hours and the rapid pulse subsides. It would seem that a fair-sized vessel has been eroded, resulting in a brisk hæmorrhage for a short period followed by vessel retraction, firm clot formation and no further bleeding. This may occur at any age and often without any previous ulcer history. Finally, there is the massive hæmorrhage which starts much in the same way as does the gross but the more serious nature soon becomes apparent. The patient is evidently more ill and there is progressive fall in blood pressure and hæmoglobin with a corresponding rise in pulse rate. Shock may supervene at any moment. Massive hæmorrhage is most liable to occur during the fourth or fifth decade in patients with a long history and/or arteriosclerosis.

It will be noted that I have attempted to distinguish between the two more severe types of hæmorrhage. This has not been done generally, the terms gross and massive being used interchangeably. It must be admitted that it is not always possible to make the distinction but where it *is* possible, I believe it has an important bearing on observation and therapy. This point will be referred to later.

METHODS OF MEDICAL TREATMENT

Prior to the introduction of the prompt feeding regimen, the generally accepted method of medical treatment consisted of immobilization, starvation and morphine. Immobilization was considered necessary to help control the bleeding, starvation to prevent dislodgment of the clot and morphine to allay restlessness. The treatment was given during and for several days after the hæmorrhage. With this regimen, the mortality rates reported varied from 8.7 to 25%, the majority being in the higher figures. Such unsatisfactory results prompted Robert Hutchison to state before the Royal Society of Medicine in 1924 that there was no medical treatment for hæmatemesis. He predicted that

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Read at the Seventy-fifth Annual Meeting of the Canadian Medical Association, Section of Medicine, Toronto, May 25, 1944.

there would be, in the next decade, a swing toward surgical treatment. His prediction came true, but the surgical results were much worse than the medical, except in one series of 51 cases reported by Finsterer[2] in 1936. All of his patients were operated upon within 48 hours and the mortality rate was 5.9%.

THE PROMPT FEEDING REGIMEN

In 1927, Andresen[3] recommended the administration of a mixture of gelatin, orange or grape juice and lactose immediately bleeding had ceased, but presented no results. Thus the credit for the introduction of the prompt feeding regimen for ulcer hæmorrhage goes to Meulengracht,[4] who, in 1933 reported a series of 109 cases with a mortality of only 1.8%. Starting immediately with the onset of hæmorrhage, he gave his patients a full well-balanced diet, six meals per day, consisting of milk, cereals, eggs, meat, cheese, puréed vegetables, bread, stewed fruits, tea and cocoa. Alkalis and iron were also given.

Meulengracht based his regimen on his observations that patients often died of general exhaustion after hæmorrhage, that bleeding in some cases stopped when food was given, that ambulant patients with hæmorrhage frequently recovered with no change in diet. He contended that starvation was harmful when the patient needed support and that it prevented ulcer healing by reason of low caloric and vitamin intake and the action of acid in the empty stomach. This latter point was supported by Alvarez and Carlson[5] in 1936 who referred to the deep hunger contractions in the fasting stomach and the action of strong, unbuffered gastric juice on the delicate fibrin of the clot. In the same year, Abbott and Pendergrass[6] reported that morphine caused a decided lowering of tone in the duodenal cap, a condition exactly opposite to the constriction desired to promote cessation of bleeding. Thus the conservative medical treatment by starvation and morphine appeared to be based on unsound therapeutic principles.

Meulengracht also claimed for his regimen a marked improvement in the morale of his patients. They were not apprehensive or restless but calm and comfortable. They did not complain of nausea or of that feeling of exhaustion so common with treatment by starvation. These points have since been confirmed by many authors; Witts,[7] for instance, who states that his patients "look, feel, and do well" and attributes this condition to an ample supply of fluids preventing shock and to the maintenance of adequate nutrition combating exhaustion.

RESULTS OF PROMPT FEEDING

The prompt-feeding program was eagerly accepted and tried all over the world. Ten years have passed since its introduction and it should now be possible to estimate its value. The slogan "Have a hæmorrhage and eat a beefsteak" was received with reserve by the profession, especially on this continent, but modified diets have been widely used. As might be expected, there is still some disagreement but it is to be noted that those who disagree completely with the Meulengracht regimen nevertheless recognize the principle of prompt feeding, using a modified diet.

In October, 1943, Rasberry and Grier Miller[8] reported the results of 2,111 cases treated by prompt and frequent feeding which had been collected from the recent literature. The gross mortality was 4% and the corrected mortality excluding perforated cases, pneumonia, coronary occlusion, etc., 1.9%. With this extremely low mortality, they recommend that surgical treatment should not be considered at all in the early stages, regardless of age, and evidence of repeated or continued bleeding. They admit that some cases will die which might have been saved by early surgery but argue that the medical mortality is so much lower than any surgical series yet reported that it would not be safe to try and select cases for early surgery and risk a higher total mortality.

There have been some reports unfavourable to the Meulengracht regimen. Boyd and Schlackman[9] and others found some patients who could not take the diet at all. Bockus[10] in his recent book on Gastroenterology argues (1) that only 30% of Meulengracht's cases had x-ray evidence of ulcer, the majority therefore being cases of erosion or superficial ulcerations; (2) that the ingestion of heavy meals defeats the principle of ulcer management, namely, acid neutralization and gastric motor rest; (3) that he can see no reason why ulcers which bleed should be treated in such a radically different way from ordinary active ulcers; (4) that "clinicians inexperienced in ulcer management and incapable of an accurate and rapid estimate of the *status quo* of the hæmorrhage may employ the regimen routinely" with resulting harm in some cases.

It is to be noted, however, that Bockus accepts the principle of prompt feeding in recommending small hourly feedings for patients not in shock.

MODIFIED REGIMEN ACCEPTABLE

It would seem that as in most arguments the truth lies somewhere between the two extremes, the Meulengracht regimen and the old starvation program. The principle of prompt feeding has been generally accepted and Meulengracht himself in later papers[11] stated that it didn't matter what the particular diet was provided it was fed promptly. In my own cases, I have used the well-known bland, puréed diet with six feedings at two-hour intervals commenced immediately the patient is seen or admitted. Adequate fluid intake is most important in preventing shock. Morphine and other opiates are avoided in favour of the barbiturates sometimes given subcutaneously but usually by mouth. A mixture containing 1/200 gr. of atropine sulphate and ¼ gr. of phenobarbitonum per dose given three or four times daily before food has proved to be very helpful as a mild sedative-antispasmodic. This is the modified regimen which is proving successful in most clinics on this continent.

IMPORTANCE OF IMMEDIATE FEEDING

It is necessary to stress that, while modification of diet is permissible, there must be no modification of the principle of prompt feeding. In spite of all that has been said and written about this principle of treatment, I find many physicians who profess to follow it and yet do not actually give food for twelve to twenty-four hours. It is obvious that this is *not* prompt feeding and the results I have seen have been invariably bad. We must overcome our conservative tendencies and start feeding *at once,* in the midst of hæmorrhage, if this type of treatment is to prove successful. Let us recognize the fact that the prompt feeding regimen has passed the experimental stage and that if we would give our patients the best chance of survival, we must follow it to the letter.

TREATMENT OF SHOCK

The treatment of shock will not be discussed in detail. Immediate therapy is again essential. There may be some delay in obtaining blood plasma so in the meantime start at once 5% glucose saline intravenously and give it slowly. Unless the red blood cells have fallen below two million, it is not necessary to transfuse with whole blood. In fact, owing to the possibility of reaction and anuria the former practice of giving immediate blood transfusions to patients with ulcer hæmorrhage has now been abandoned. If the patient is in shock, blood plasma should be used as soon as possible. About 500 c.c. of plasma and an equal amount of glucose saline is all that is advisable to give the patient in the first twelve hours. When the patient has recovered from shock, start the frequent feedings immediately.

OBSERVATION OF THE PATIENT

Every effort must be made to obtain an accurate history either from the patient or a member of his family. Previous history of ulcer symptoms, of hæmorrhage, of hypertension, of loss of appetite and weight, has obviously an important bearing on treatment and prognosis.

Close observation of the patient is an essential part of successful therapy. The pulse and blood pressure must be recorded every half hour, the hæmoglobin estimated every two hours and the output of urine measured. Any sudden change in the patient's condition should be immediately reported. We must try and estimate the extent of the hæmorrhage. Is it gross or massive?

The most difficult decision for the physician to make is whether the patient is having repeated hæmorrhages, or is continuing to bleed. In addition to a rising pulse, falling blood pressure and hæmoglobin and onset of shock, one must bear in mind the patient's age and any past or present evidence of arteriosclerosis. Further help may be obtained by following the blood urea concentration. If this rises steadily in the first twenty-four to forty-eight hours and exceeds 100 mgm. per 100 c.c., it is evident that the hæmorrhage has been extremely severe and is likely continuing. If there is evidence of repeated or continued bleeding, the question of emergency surgery arises.

EMERGENCY SURGERY

Although most physicians who have written on this subject are now agreed that in view of the low mortality from medical treatment surgery should not be considered, I still believe that in carefully selected patients whose age, history, and clinical findings suggest continued bleeding from a sclerosed vessel, emergency sur-

gery within the first 24 to 48 hours is a life-saving measure.

To summarize, I would say (1) that the principle of immediate and frequent feeding has proved to be the method of choice in the treatment of ulcer hæmorrhage; (2) that to be effective, it is essential to start the feedings immediately; (3) that the barbiturates are preferable to the opium derivatives for sedation; (4) that by means of a carefully taken history and close observation of the patient, it should be possible to distinguish between gross and massive hæmorrhages; (5) that in massive hæmorrhages with evidence of continued or repeated bleeding and arteriosclerosis, early surgery should be carefully considered.

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RÉSUMÉ

L'ulcère, manifestations de tous les âges, peut donner lieu à des hémorrhagies de diverse importance.

La conduite à tenir sera variable selon l'histoire du cas, l'âge du sujet et l'importance de l'hémorrhagie, cependant, l'expérience démontre qu'il est nécessaire de nourrir ces malades immédiatement et fréquemment.

La sédation obtenue par les barbituriques donne de meilleurs effets que le soulagement que peuvent donner les opiacés. Une histoire de cas bien faite et une observation méticuleuse du malade devraient permettre assez facilement d'estimer si l'hémorrhagie est de moyenne intensité ou si elle est massive. Dans les cas d'hémorrhagie massive, surtout s'il se surajoute des signes d'artériosclerose il faudra recourir précocement à la chirurgie.

JEAN SAUCIER

THE COURSE OF PREGNANCY FOLLOWING TOTAL OVARIAN ABLATION*

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HOW long the ovarian corpus luteum is indispensable for the maintenance of pregnancy in the human is still shrouded in uncertainty. The rôle of the corpus luteum in the production of progestational endometrial changes in preparation for nidation of the fertilized ovum is now well established. In a few mammalian species it has been shown that removal of the corpus luteum exerts a definite effect upon the pregnancy, depending upon the stage of gestation. The pregnant rat, mouse or rabbit, for example, invariably aborts after castration, while the guinea pig, which has a long span of gestation, can spare its ovaries after the mid-period. Hartman[1] has recently demonstrated that in the rhesus monkey the ovaries are not necessary from the 25th day of pregnancy on, for normal gestation, parturition at term, post-partum involution of the uterus and lactation. Surprisingly, the bright red colour of the sex skin was maintained in the absence of the ovaries not only during gestation but also during lactation. In the human subject the matter is under dispute. From the clinical literature many cases can be cited in which abortion was seen to follow removal of the corpus luteum, while there remain positive cases in which castration did not interfere with pregnancy!

Jones and Weil[2] report a case in which the corpus luteum was removed early in pregnancy without abortion following. They found that no pregnanediol was present in the urine for about twelve days after removal of the corpus luteum. At the end of this time it reappeared in increasing amounts. Indeed, œstrin as well as pregnanediol (Hartman) is recoverable from the urine despite the removal of the ovaries. Therefore, one may infer from this that sooner or later the placenta takes over certain ovarian functions. The case we are presenting demonstrates an early dispensability of the corpus luteum, and a low quantitative excretion of pregnanediol following its removal with a con-

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tinuation of the pregnancy for three months, during which time there was no ovarian tissue present.

CASE REPORT

The patient, Mrs. O., aged 40 years, of French Canadian extraction, was admitted to the Women's Pavilion of the Royal Victoria Hospital, Montreal, on October 1, 1942, with complaints of vaginal bleeding for five weeks, accompanied by lower abdominal pain. She stated that her last menstrual period started on August 12. Examination revealed a cystic mass in the pelvis diagnosed as a left-sided ovarian cyst, while a questionable diagnosis of an associated uterine fibroid was made. At this stage pregnancy was not suspected. A laparotomy was performed on October 9, with the intention of removing the cystic mass and doing a hysterectomy. The right ovary and tube had been extirpated five years previously. On opening the abdomen the left ovary was found to contain a thin-walled cyst, the size of a baseball, twisted on its pedicle and impacted in the *cul-de-sac*, and fixed in this location by a few adhesions. The uterus was enlarged to the size of a two-and-a-half months' pregnancy, and exhibited the congestion and softness characteristic of pregnancy. The left ovarian cystoma was excised and the uterus was left *in situ*.

In view of the preoperative bleeding which now became recognized as evidence of threatened abortion, it was thought probable that the products of pregnancy would be spontaneously expelled. This was not the case, however, as no further bleeding developed. At this time the Ascheim-Zondek test was weakly positive and Dr. J. S. L. Browne, Director of the Department of Endocrinology, took pregnanediol estimations of the urine. During the postoperative period from October 16 to November 6 (from the 63rd to the 83rd day of the pregnancy) all pregnanediol readings were zero. On October 22 the prolan estimation was 715 units in 24 hours, while on October 23 and 24 the prolan had dropped to 66 units.

The patient ran an uneventful postoperative course and no threat of miscarriage developed up to the time of discharge from the hospital on November 7. At this time the uterus seemed to be growing and the cervix was closed. Unfortunately, the patient failed to follow instructions regarding the saving of urine specimens, and none were obtainable from the time of her discharge until her readmission on December 14. At this time she complained of abdominal pain and vaginal bleeding. The uterus had grown perceptibly since her discharge, the fundus being palpable about two fingers above the level of the umbilicus. The cervix at this time was still closed although there was moderate profuse bleeding. Following the administration of sedatives, the bleeding ceased and the cramps subsided.

Further pregnanediol assays at this time revealed the following results: December 15, 18.9; December 17, 9.8; December 20, 4.9; December 21, 4.9.

The Ascheim-Zondek test on December 15 was still positive and x-ray examination at this time showed a normal fetus of about four and a half months' development.

On December 28 and 29 the vaginal bleeding started again and continued in association with uterine contractions until the fetus was expelled on January 2.

The fetus appeared to be of five months' gestation and was alive at birth. The placenta failed to separate and moderate hæmorrhage necessitated its surgical removal from below.

Pathological report.—The placenta proved rather interesting, possessing several almost separate lobules. Part of the maternal surface exhibited a dead-white shaggy appearance while other parts appeared hæmorrhagic. Microscopic sections showed the placenta to be of five months' maturity with marked retrodecidual hæmorrhage and marked hyalinization of the decidua. Pathological examination of the ovarian cyst removed at operation showed a unilocular follicle cyst, the thinned ovarian cortex containing the corpus luteum of pregnancy. Microscopically, the cyst was lined by a flat cuboidal epithelium and the ovarian cortex exhibited a few areas of blood extravasation.

COMMENT

The chief point of interest in this case lies in the fact that in the absence of both ovaries the pregnancy continued to develop. During the period from October 15 to November 6 there was a total absence of pregnanediol in the urine. This is most unusual, and Dr. J. S. L. Browne states that he has only seen one case where the pregnanediol level dropped so low and yet the pregnancy continued to develop. It would appear that following the removal of the corpus luteum in the wall of the cystoma the placenta failed to elaborate sufficient pregnanediol to make its appearance in the urine for a considerable period following the operation. This period was evidently at least a month, and possibly two months, one might judge, from our unfortunately incomplete assays.

It is regrettable, from a scientific standpoint, that this case did not go on to maturity. One factor, perhaps, had a bearing on its premature termination, *viz.*, that the patient was extremely anxious not to bear another child. She already had four and she had not been living with her husband for over a year. Therefore, we consider it highly probable that abortion was attempted prior to her second admission. It seems likely that if spontaneous abortion had been inevitable as a result of the removal of the corpus luteum at two-and-a-half months' gestation, this development should have occurred before the 12th or 14th week. The fact that the pregnancy survived the operative manipulation, the removal of the corpus luteum and the low pregnanediol level, and continued to develop to the five months' stage suggests that the pregnancy might just as well have gone on to maturity.

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Men learned to write as we now learn to play golf, and the result bears the same relation to potential literature as the play of golf bears to modern business.

MENTAL ADJUSTMENTS TO INDUSTRIAL SITUATIONS*

By Baruch Silverman, M.D.

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THOSE of us who have worked in the Montreal area for a good many years in an attempt to deal with problems of human behaviour, naturally feel that the interest shown in this series of lectures is a very real and great step forward on the part of the industrial community, because if this interest can be maintained and if practical measures can be devised so that definite steps may be taken in order to deal with such human problems we are bound to see very important results.

The first is very obvious indeed; namely, that it is bound to lead to an increase in the quality and quantity of the industrial output. The happier and better adjusted a person is at his work, the better job does he do, the better is the nature, the quality, and the quantity of his actual output.

Secondly, such interest will undoubtedly lead to a more sympathetic and understanding relationship between employer and employee, and that is very important. We will have serious problems to deal with in the immediate post-war era, and anything that can be done to better employer-employee relationships will result in improvements in the whole field of human relations, something with which we all have to begin to concern ourselves very seriously, and immediately.

Anything that can be done to deal with problems in human behaviour in the industrial set-up will also help in a great measure and contribute in a real way to what physicians, especially those interested in mental health, call the whole problem of the treatment and prevention of mental disorders. Mental hygienists cannot refrain from taking advantage of an opportunity like this to call your attention to the fact that mental disorders constitute a very serious health problem and a very marked burden on the community. This can readily be seen from a report made to the Quebec Legislative Assembly about a year ago, in which it was pointed out that in this Province there are about 10,000 beds in hospitals for patients who are physically ill, whereas there are approximately 12,000 beds in hospitals for patients who are mentally ill. At any given time, then, there are more patients in our mental hospitals than there are in all the hospitals for physical diseases. Furthermore, according to the incidence of mental disease, we know that, for every child who graduates from our public schools into a university, four children will eventually enter a mental hospital. In other words, there is far too much nervous and mental disorder, and anything that can be done to prevent this serious health problem obviously is very important. And so it seems necessary to emphasize the fact that this interest in human behaviour in industry will not only produce excellent results in industry itself but will have favourable repercussions in the whole health field, particularly the mental health field.

Our specific concern in this discussion is to attempt to outline the manner in which the individual meets situations in life, particularly in industrial life. When we ask ourselves, then, on what these behaviour responses depend the answer must be that they depend primarily on three general considerations.

The first is the nature and requirements of the particular job which the individual has to do. Secondly, his physical constitution and his mental development. And, thirdly, and this is a point which requires special emphasis, the mental attitude of the foreman, the supervisor, the personnel adviser, and, in fact, the whole of the executive management. We have perhaps not given enough consideration to this particular fact.

In order to understand the behaviour of the individual worker it is important to avoid certain misconceptions which many people have regarding human behaviour and which prevent them from approaching the problem in an intelligent way.

The first misconception is that human behaviour, as so many people still believe, is something which is directly inherited, something which a person is born with. So many people assume a fatalistic attitude towards human behaviour because of this point of view. It is important for those who are going to concern themselves with human beings to remember that heredity has been much over-emphasized and over-stressed in this regard. Not only where normal behaviour is concerned should

* An address to doctors and nurses in industry and personnel administrators. Given under the auspices of the McGill Medical Faculty, January 19, 1944.

we in a considerable measure discount the factor of heredity, but where so-called "queer" behaviour responses are concerned. Even in many mental disorders we know now that heredity does not play nearly the important rôle which was at one time assigned to it. It is a fact that the majority of patients in mental hospitals do not have histories of mental illness in their families. This realization that complex behaviour patterns are not inherited, enables us to appreciate the fact that the way in which an individual meets situations depends largely on the experiences he has had within his lifetime, particularly the experiences he has had when he was quite young. Physicians know that the physical structure of the human organism depends to a large extent on what happens in the first few months of development, in the embryonic stage, before the child is born. Just in the same sense that these few months are important to physical development, are the first few years of life important to mental development and, things that happen to us when we are children, when we are very young, in many instances continue to determine our attitude to life and make us behave as we do.

A further consideration in this regard is the fact that we tend to view human behaviour as a spontaneous reaction on the part of the individual. Where human behaviour is concerned many people have not as yet arrived at a point where they can think in terms of reasons and causes in the same way as they think of changes in the physical system. When a person has a headache, a gastric upset, a severe pain, an elevation of temperature we look for a cause, but when a person does or says something which is odd or different from the normal we do not readily think in terms of reasons for such conduct. We forget that there are various factors and circumstances in the environment which make the individual behave as he does. As a result we tend to react to such behaviour with a resentful and antagonistic rather than an objective and impartial attitude. We must appreciate the fact that in many instances the individual is just as little responsible for his behaviour as he would be for developing pneumonia or typhoid fever. In both instances he is the victim of circumstances, in the sense that environmental factors make him behave as he does. This then is an additional point to keep in mind in order to appreciate the significance of the responses which are found in workers in industry.

Another fact to keep in mind is that human behaviour has a purposive character, that it serves a specific purpose in the life situations of the individual. In most instances the purpose is obvious, but quite frequently we meet people who do things with no apparent purpose. Their behaviour seems senseless and purposeless, but where that is the case, on careful analysis, the purpose of the behaviour pattern becomes obvious.

Let me illustrate this with the case of a man whom I saw some time ago for one of the social agencies which had to support him and his family because he could not keep a job. He was an excellent mechanic, very skilful and readily obtained employment, but he kept losing one position after another because he would get into fights with his foreman and supervisor. On examination it became obvious that while this man realized the seriousness of his position and appreciated fully the need for continuous employment he, nevertheless, was unable to stand the slightest criticism or any attempt on the part of his supervisor to direct him in his work. Here then is an intelligent man, a competent employee, whose main difficulty is that he cannot accept any direction from a person in a position of authority. On analysis of his particular problem it became evident that this man as a young boy had been badly treated by his father who was rather harsh and severe with him. He grew up to hate his father. Since the father was the authority in the home this boy developed a hatred for authority in general and it manifested itself in difficulties with his school teacher throughout his school period. He grew up to be an intelligent capable person, but when anyone tried to discipline him he always reacted violently. He carried over the same resentment to his industrial situation and in arguing and fighting with his supervisor he was really "getting even with his father" whom he identified with anyone in a position of authority. So that while this man and his family undoubtedly suffered because he lost one position after another he obtained considerable satisfaction from this dilemma by virtue of the fact that in an indirect sense he was asserting himself in such a manner as he had been unable to do with his father when he was quite young.

It is important to realize that such individuals are not conscious of the true cause of their behaviour, but that these causes lie below the threshold of consciousness. Many things which happened to us long ago and of which we are not at all aware continue to influence our behaviour even though these incidents and experiences have been forgotten. It can therefore be taken for granted that human behaviour is not only produced by certain causes but serves a specific purpose in the life situation of the individual.

We must begin to realize then that the human mind is not as mysterious and unpredictable as so many people still believe. There are ways of studying the mind and understanding the manner in which it functions. Mental development can more readily be studied in terms of structure and function, in the same manner as we study physical development. The mind is built up of certain structural elements such as intelligence, instincts and emotions. These elements can be analyzed and understood. Intelligence is the capacity to learn and individuals vary in this respect. Some have better capacity with regard to certain specific abilities, such as mechanical ability, motor dexterity and verbal facility. These capacities which are so important in appraising the individual's ability to cope with a specific job can be determined by the use of intelligence tests. Such tests enable us to arrive at an I.Q., or intelligence quotient, which is readily understandable when we consider that it is merely the relationship between the chronological age and the actual mental age or mental capacity as gauged by the use of such tests. This ratio or relationship between the chronological age and mental age is not a mysterious thing and is not very difficult to understand when one gives this matter a little thought.

Nor is it so difficult to appreciate what is meant by instincts and emotions. An instinct is a tendency to behave in a certain way. An emotion is the excitement which the individual feels when he has a tendency to behave in a certain way. For example if we have an instinct to escape from a dangerous situation, then we experience an emotion of fear—we are afraid. The tendency to escape is the instinct. The feeling of fear which accompanies it is the emotion. There are many such instincts and many such emotions.

The manner in which the mind functions is not only dependent upon the nature of these structural elements but on the way in which they are integrated or built together as a functioning unit. Unfortunately, many things happen in life which result in certain emotions becoming tied up with specific ideas into constellations or what are sometimes known as complexes. A complex is a certain idea or group of ideas emotionally toned, and such mental constellations frequently influence our behaviour in undesirable ways.

The important point to consider here is the manner in which ideas, emotions and instincts become integrated or built together. The process of integration depends on whether or not the individual can get a certain amount of satisfaction as he grows up. During the growth process it is essential to have a certain amount of affection, a feeling of security and belonging in the particular environment in which the person lives as well as an opportunity to dominate certain situations and to feel that one is performing adequately. If these conditions are fulfilled, if we have the feeling that we are doing a good job and can get recognition for it, then the ideas and emotions become integrated in a normal way. The feeling that one is doing a good job is of course of the utmost importance in industry. May I refer to an interesting quotation from "Psychology for the Fighting Man", which incidentally is an excellent summary of the things which an individual must know in times of danger. In the section which deals with the importance of getting satisfaction out of one's work a reference is made to the fact that when the employees of the General Electric Company heard that a certain mysterious plastic which they were making helped General Doolittle to steer his plane over Tokyo, production jumped almost 300% over night. It was this feeling on the part of the employees that they were doing something real, something extremely satisfying, something that contributed to what everyone wished for, which increased productivity to such an immense degree.

It is obvious therefore that if as an individual grows up, opportunities are presented to him to get satisfaction out of what he does, if he has a sense of security in his environment and if at the same time he can get such satisfaction without interfering too seriously with the cultural pattern of the group with whom he

lives, then the structural elements of his mind become properly integrated, and his mental development progresses along normal lines. If on the other hand certain things happen to prevent the individual from getting satisfaction in the process of growth, then mental development proceeds in somewhat irregular directions and this manifests itself in various abnormal types of behaviour responses. For example, if a child grows up in a home where he is overprotected, where his parents are too solicitous for his welfare, where they do too much for him, or if he lives in an environment where for certain reasons he develops a feeling that he is rejected, unwanted, and is therefore unhappy in his social setting, or if he is unfortunate in his school situation where he cannot get sufficient satisfaction out of his academic work then his mental development does not progress along normal lines. In such instances the emotions and instincts attach themselves to certain ideas and eventually this expresses itself in abnormal behaviour.

We have now arrived at a point in this discussion which leads us to conclude that an individual meets situations in life and particularly in the industrial setup in one of four ways.

The first is the normal way, and the normal way is an aggressive, intelligent attempt to attack problems with which one is confronted. This manner of meeting situations involves a capacity to make rational decisions not decisions based on emotional attitudes. Many people make decisions which are not based on reason, although the individuals themselves think that they are very reasonable. Actually, they are motivated by certain feelings which precipitate the decisions they make. The normal person in an individual who is sufficiently well integrated that he can decide to take a course of action which is based on an objective appraisal of the known facts of a situation. Furthermore, the relatively well integrated individual behaves in accordance with the accepted cultural patterns of the environment in which he lives. It is important however to realize that under great stress even a normal person may become irritable, pre-occupied, mildly depressed and at times somewhat excited.

The second way to meet situations in life may be called the maladjusted way, but it is still a relatively normal response. We must remember that there is no rigid line of demarcation between so-called normal and abnormal behaviour and that many normal people may appear to be somewhat maladjusted. This second manner of meeting situations in life is found in individuals who are faced with conditions which are too complicated for them. Such a person becomes more aggressive than usual and rather belligerent. He tries to literally fight his way out of a dilemma by manifesting an air of superiority, which is frequently a rather obvious defence for feelings of inadequacy, an attempt to pretend, as it were, that he is better than he really is. When this characteristic is found in an employee it may precipitate difficulties. For such a person is apt to reject authority and convention to a certain extent. Some of these people become rather openly rebellious against the *status quo*. They are never satisfied and they take every opportunity to rebel against even ordinary restrictions. They become agitators and disturbers, not because there are genuine reasons for agitation and reforms in the particular setup in which they work, but rather because they are badly adjusted and have to behave in this manner because of unsatisfactory experiences which they had when they were young.

The third way of meeting a situation which is particularly difficult is to run away from it. There are certain individuals who withdraw so to speak, from the difficulties of life. They become very shy, timid and seclusive. They cannot accept responsibility and tend to make excuses for not meeting the requirements of the job. These are individuals who have a tendency to day-dream excessively in order to pretend that they are obtaining the satisfaction which they are unable to get in real life. While day-dreaming is a relatively normal phenomenon, particularly in young people, it is essentially a characteristic of adolescence, and if indulged in excessively beyond this period of life, it has an unwholesome effect. Where a worker continues to resort to day-dreaming he usually manifests poor self-control and is more readily involved in accidents. His mind is not on what he is doing and he is therefore accident-prone.

The fourth way to meet situations in life may be termed the abnormal way. Certain individuals who have not been properly integrated mentally, when faced with difficult situations can only solve their problems by becoming ill. We see such reactions develop readily in young children. When a child is not prepared for an examination and pleads a headache, and if his

mother is too solicitous for his welfare and accepts this excuse he learns in this manner to avoid his difficulty by resorting to illness. It is true that one usually finds such a development in certain types of environment. A headachey child grows up in what might be called a headachey family. If this behaviour pattern continues to develop, such an individual may in later life tend to avoid difficulties by developing numerous physical complaints for which there is no physical basis but where there is a mental cause. These people tend to become ill readily. They develop various complaints, gastric upsets, palpitation, and other physical characteristics as a reaction to problems with which they are confronted either in their own home or in the industrial situation. It must be remembered that such people do not choose voluntarily to become ill. This type of behaviour response becomes automatic in them so that they really feel sick and are entirely unaware of the reasons for their complaints.

It is important to emphasize here that there are methods by means of which one can predict with a fair degree of probability the type of behaviour response which may be expected from an individual in an industrial situation. This can be done with the use of intelligence tests, by means of proper medical examination, by making an adequate appraisal of the personality characteristics of an individual, and by the use of proper personnel selection methods. These are also instruments which enable us to detect early signs of behaviour disturbances in workers on the job.

One may therefore summarize this whole subject by stating that the approach to the problems of human behaviour in industry must be determined by the following basic principles.

We must appreciate fully the significance of the individual employee's intellectual capacity and his personality make-up. We must develop a more sympathetic and understanding attitude to the problem employee, by realizing that he behaves as he does because he cannot help himself. He is in a sense a victim of circumstances and does not freely choose to behave as he does. Such understanding on our part will counteract any tendency to deal with him severely and will make us appreciate that a sympathetic and understanding approach is the only one which can produce the desired effect.

We must appreciate fully the fact that excessive worry because of difficulties on the job or in the worker's home will interfere with efficiency and decrease productivity.

In order to cope satisfactorily with the problem employee it is important that the foreman, supervisor, personnel department and executive management should have complete confidence in and co-operate closely with the medical department, because physicians and nurses are now fully aware of the mental hazards which may have a serious effect on the employee.

Another important consideration in this regard which deserves special emphasis is the necessity for the development of a consistent and sympathetic person-to-person relationship between the employee and the foreman or immediate supervisor so that variations in behaviour on the job may be detected early and dealt with before they develop into serious problems. A sympathetic supervisor-employee relationship enables the worker to talk more readily about his difficulties and this has great value in helping him when he is worried or in distress over a specific problem. Physicians realize fully the profound therapeutic effect of a so-called heart-to-heart talk with a patient. Quite frequently no other treatment is resorted to, and the patient feels a great deal better because he gets emotional release in this manner. This indicates clearly the value of using such modified mental catharsis right in the plant where the superintendent, supervisor or foreman can in such a capacity literally help the employees under his control.

To facilitate such a state of human relationships in industry it is obviously essential to have an intelligent, enlightened, sympathetic and well-adjusted group of individuals who comprise management. Most of the individuals who are in a position of authority in industry are undoubtedly eminently fitted for their responsibilities, but there are certain instances in which they are not sufficiently well-adjusted themselves and this reflects itself in the industrial output of the workers under their control. It is therefore important that the individuals who are in a position of authority, should not only be intellectually competent for their work but temperamentally suited for their responsibilities, and have well integrated personalities so that their own problems and personal difficulties will not influence their

decisions and in that manner affect adversely the reactions of the workers who are dependent upon them. For we all know that if the person in authority is unhappy and worried about personal problems it will reflect itself in a state of irritability and impatience with the workers who depend on him, and will frequently result in his making unreasonable demands with reference to specific job requirements. In any attempts therefore to improve human relationships in industry it is obviously essential not only to give consideration to the adjustment of the individual employee, but also to apply these same principles to the foreman, supervisor and in fact everyone in control of the workers, including executive management.

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INTERNAL FIXATION OF FRACTURES OF THE NECK OF THE FEMUR

By Duncan W. Boucher, M.D.

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SINCE the introduction of the three-flanged nail in 1931, by Smith-Petersen, the treatment of fractures of the neck of the femur has been simplified and the results are so spectacular that other methods of treatment should be discarded. Previous to this time many types of nails or screws had been used. In 1928 Professor Noordenbos, of Amsterdam, had used the fibula as a bone graft implanted into the neck. Only since the introduction of rust-proof or non-electrolytic steel in conjunction with the flanged nail has internal fixation gained so much favour. The early types of three-flanged nails were chrome plated and the steel underwent a change, attributed to electrolysis, which tended to allow the nail to loosen. In those cases in which this happened, healing was retarded, and results poor. Since the introduction of the Smith-Petersen nail three facts are noted, life is prolonged, union is the rule in the great majority, and functional results are good. The nail can be used for a number of purposes in this region but I wish to restrict my discussion to its use in fracture cases only.

The three-flanged nail with central canalization, introduced by Sven Johanson, can be used in the following fractures of the neck of the femur: subcapital, transcervical and intertrochanteric. It can be used in the pertrochanteric fracture but one usually must use a metal plate to hold the nail to the lower fragment. Since the introduction of the metal plate by Zimner Manufacturing Co., used with the three-flanged nail, the latter's usefulness has been greatly increased.

If the patients are comfortable there is usually no need to subject them to the nailing procedure until they are in the best possible condition. However if they are in severe pain after the accident, this should be relieved by nailing as soon as possible. Otherwise their condition will deteriorate rapidly and they may never be in condition for operation. One must not forget that we are dealing with patients well past middle life and that their threshold of pain is decreased; any pain prolonged in these individuals rapidly lessens their resistance or will to live. Therefore I make it a rule that if a patient is in pain, the fracture should be nailed as soon as possible, considering the patient's general condition.

If the patient's condition does not warrant operation as soon as the immediate shock has been combated, I have treated them by simply supporting the leg on a soft pillow, and this position is maintained by sandbags placed under the pillow so that the leg lies in a well padded trough. I have never used traction preoperatively and see no need of it, unless the fracture is many days old. I think a fracture which has occurred forty-eight hours previous to operation is as easily reduced as one of a few hours' duration. By maintaining the limb on the supported pillow the preoperative preparation is easily carried out, without too much disturbance of the injured limb.

The choice of anæsthetic in these usually elderly patients is limited in our work to nitrous oxide and oxygen, spinal and in one case local infiltration.

In using nitrous oxide I find that relaxation is sufficient for the complete reduction of the fracture and is probably the easiest and safest for administration to these patients. However if there is some contraindication to the use of

this agent then spinal anæsthetic is used. One very old patient who was a poor risk for general anæsthetic could not be turned on her side due to pain. So the fracture was reduced and the nail inserted after local infiltration. After the fracture has been reduced and the guide wire introduced, the amount of relaxation is decreased and these patients may then be kept asleep with the minimum amount of anæsthetic. I feel that intravenous anæsthetic has a definite future in this type of work.

The operative procedure to be carried out can be greatly facilitated by the team work of the surgeon and radiologist. The surgeon must have a rudimentary knowledge of positioning the patient and tube, the radiologist must understand each detail of the operation. If both men are confident of each other's ability then the operative time is decreased and a long procedure in inexperienced hands can be cut down to a few minutes by such team work.

On the part of the radiologist it is understood that the plates taken during the operation are used only as guides for the moment and not for permanent records. Thus no time is wasted by prolonged immersion of the plate in the fixing solution. The surgeon and radiologist examine the plates taken during the operation, the former deciding the direction of the nail and the latter confirming its length. Two directional x-ray tubes would further facilitate the procedure but such equipment is not found in all hospitals. I wish to emphasize therefore that teamwork between these two workers is absolutely essential for the success of the operation.

In spite of excellent preparation of the patient and the availability of x-ray apparatus internal fixation must not be looked upon as a simple procedure. In experienced hands the whole procedure requires not more than half an hour. I have known of the same procedure requiring two and a half hours in very inexperienced hands, and the nail still not properly positioned. The hazards are not many, but some knowledge of the technique is required in order to overcome the admitted handicap, which is the age of the patient.

The patient having been anæsthetized in the recumbent position on the table and the casette for holding an x-ray plate being under the injured hip, the procedure of reduction of the fracture is carried out. . In order to maintain and ensure asepsis the surgeon who is going to introduce the nail should not do this unless such procedure is carried out before the sterile gown, etc., is put on; this procedure should be done by the "non-sterile" assistant. In all cases Leadbeater's manœuvre of reduction is followed faithfully and the reduction achieved is excellent in every case. If the movements are carried out deliberately and cautiously they cannot fail to reposition any fracture in this region. When the fracture is reduced and the thigh is in a position of abduction, hyperextension and internal rotation the actual operative procedure may begin. In my opinion it does not make any difference whether the knee is flexed or extended after the movements are completed. I have found that with the knee fully extended the assistant may get into a more comfortable position for holding the limb and is therefore less apt to move it after the operative procedure begins.

Two operative procedures have been advocated for the introduction of the three-flanged nail. These are the intra-articular and extra-articular methods. My experience is limited to insertion and nailing by the extra-articular technique. We know that a perfect result may be anticipated from a technically perfect operation.

In my opinion the intra-articular method is somewhat more hazardous and greatly increases the amount of shock suffered by these patients. The extra-articular method is much less hazardous and the danger of sepsis with ordinary technique is practically nil. None of my cases showed the slightest amount of sepsis and the wounds healed without discharge of any kind.

The technique of insertion of the nail by the extra-articular method has as many advocates as there are methods of insertion. I have followed the method suggested by Hey-Groves and Watson-Jones, with slight personal changes. The main features of this method of introducing the nail, are: (1) Accurate measurements of its length. (2) Accurate introduction of the guide wire well into the head, leaving the guide in position until the nail has penetrated far enough into the head that one is absolutely certain that no rotation can take place if the nail is further inserted and the guide has been withdrawn. The guide wire is localized in the neck by antero-posterior and lateral x-ray plates, after it has been inserted with the aid of Hey-Groves guides and the sense of sight and touch.

Before the guide is inserted in the subtrochanteric region an incision three inches long is made down to the shaft of the bone and through it a portion of the lateral aspect of the shaft can be palpated with the finger, so that by the added sense of touch the introduction of the guide is further facilitated. An incision of this length allows the impactor to be inserted with ease, directly against the side of the shaft. When one is certain that the guide wire is well centralized in the cancellous bone of the neck the centrally canalized nail is threaded over the guide wire and vigorously hammered home. The guide wire is not withdrawn until the nail has full penetration and the fracture has been firmly impacted. Depending on the patient's condition, which is usually good, antero-posterior and lateral plates are taken with the nail in position and the guide wire removed, after completion of operation. If the position of the nail is satisfactory the incision is closed.

At this time I advocate vigorous movements of the hip joint to be carried out by the surgeon, such manipulations serving as an excellent guide to the thoroughness of the operative procedure. If the movements remain smooth without recurring deformity one can be assured that impaction is solid.

Immediately upon return of the patient to bed, the limb is supported with a soft pillow. The patient is asked to carry out full leg exercises commencing twenty-four hours after the operation. These exercises include lifting the extended leg off the bed and flexing the hip and knee to as acute an angle as possible. The patient is allowed to move around in the bed. The only care which is taken is when they are turned on the uninjured side, the injured leg must be lifted for the patient. If the patient's condition permits they are lifted out of bed on the 4th day and placed in a chair, bearing no weight on the leg. This is continued until discharge from hospital. This date depends on the financial condition of the patient and the care which the patient will receive at home. Patients may go about on crutches without bearing weight at any time after the third week and continue in such manner until the 9th week when they may bear weight on the injured leg. The crutches may be discarded as soon after that as the patient is able to do without them. They usually carry a cane for a few months thereafter, not so much for physical as for moral support.

The complications which have occurred in these cases which bear a direct relationship to the nail are, avascular necrosis of the head with associated osteo-arthritis, absorption of the neck and poor nailing.

No excuse can be offered for the patient whose nail broke out of the head, as this is directly attributable to the operative technique. However, avascular necrosis of the head and absorption of the neck is a complication which may arise as a result of the fracture in this region and I cannot explain it. I am sure the percentage of such occurrences would be considerably more by the old plaster method of treatment.

On follow-up of these cases I have had an excellent response. All patients who did not report an excellent functional result were re-x-rayed. By an excellent result I mean painless movement, without the slightest deformity or limp.

The x-ray plates show the fracture before and after insertion of the nail. Only one view is shown but this is done to conserve space, as the other view is just as satisfactory. In some cases only one plate is available and it is reproduced.

In some cases the nails are shown in position immediately after the operation, in others several days or weeks after.

The individuals whose result was unsatisfactory from the standard laid down are reproduced showing their present deformity.

No nails have been extracted, except in those cases who died in hospital, and the one case of absorption of the neck.

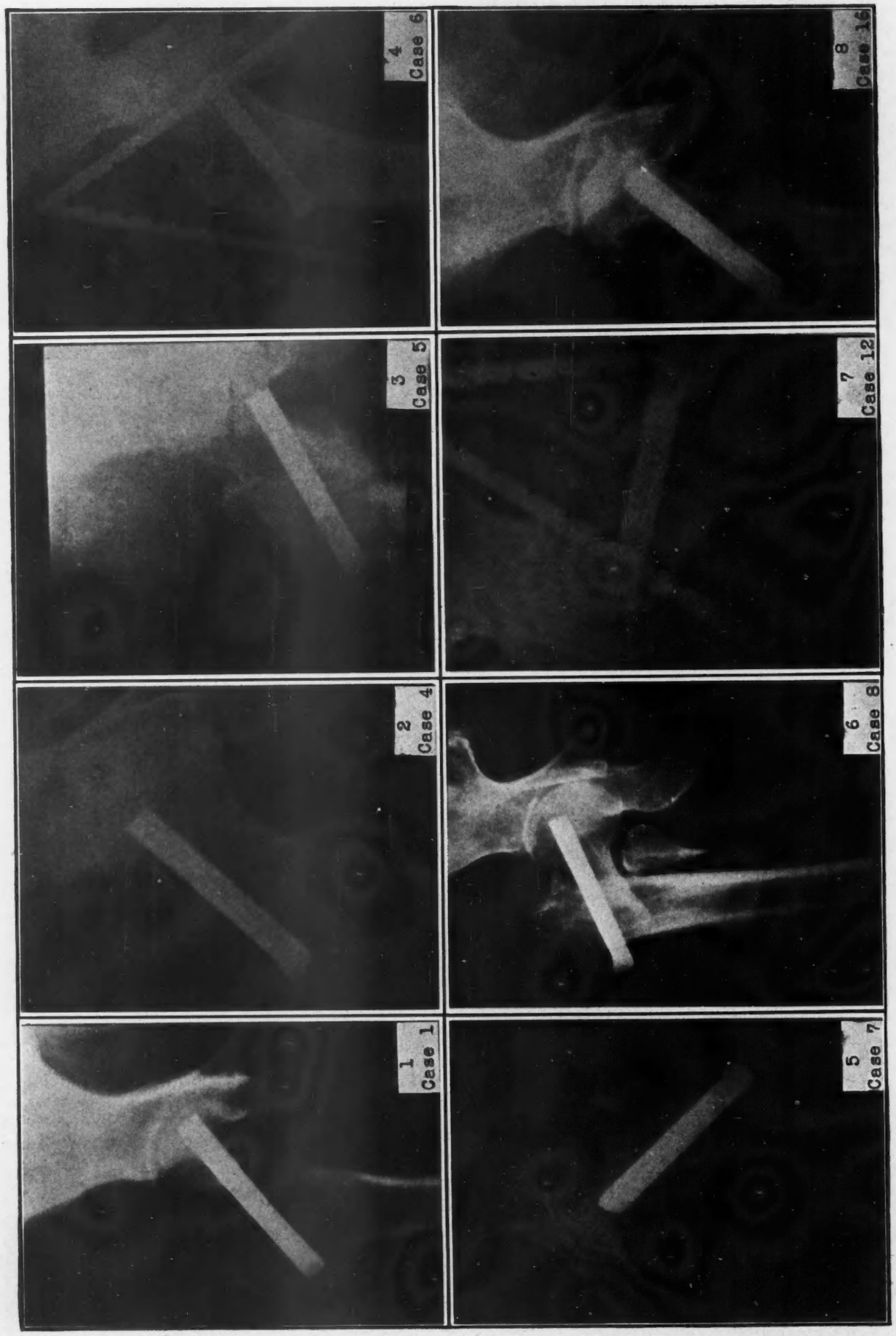
CASE REPORTS

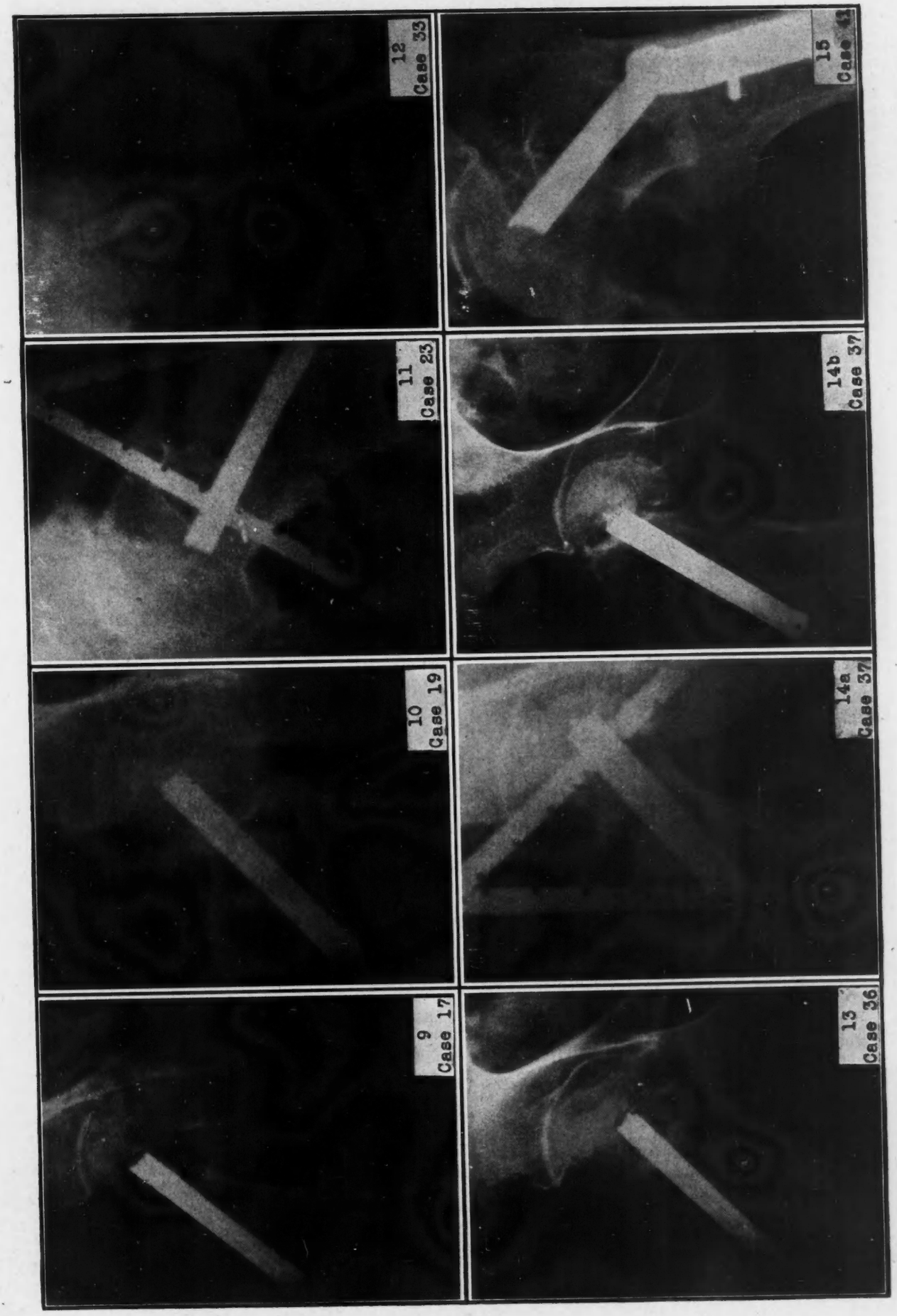
CASE 1 (FIG. 1)

Aged 59. Fell on floor while doing household duties August 18, 1938. Admitted to hospital same day with sub-capital fracture right hip, which was reduced with head in valgus position and Smith-Petersen nail inserted August 18. Patient suffered no complications. She was up on both knees in bed six hours after operation and switched on light at head of bed. Walked into my office five weeks from date of operation without crutches or cane and says that she has required no support for two weeks. End result excellent.

CASE 2

Aged 88. Fell on floor August 31, 1938. Admitted to hospital same day. Patient under treatment for carcinoma of the breast. Transcervical fracture left hip, reduced under local anæsthetic, with head in valgus position. Recovery complicated by hypostatic pneumonia. Patient out of bed on 10th day. Developed bronchopneumonia. Died September 30, 1938.


4 Case 6
8 Case 16
3 Case 5
7 Case 12
2 Case 4
6 Case 8
1 Case 1
5 Case 7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Case 36

CASE 3

Aged 58. Fell down stairs, December 19, 1938. Admitted to hospital same day. Suffered no other injuries or diseases. Sub-capital fracture, left hip, which was reduced and nailed with head in valgus position on December 19. Patient out of bed on fourth day. Discharged from hospital on tenth day. Commenced to bear weight ninth week. End result excellent.

CASE 4 (FIG. 2)

Aged 67. Fell on icy street, February 4, 1939. Admitted to hospital same day with basilar fracture of the left hip. Reduced and nailed February 5. Head in anatomical position. Patient discharged from hospital on 8th day. Walked in 9th week. She has no limp, no pain, no deformity. End result excellent.

CASE 5 (FIG. 3)

Aged 87. Fell while walking in farmyard, May 4, 1939. Admitted to hospital same day. He had marked osteo-arthritis in both knees and was a poor operative risk. Per-trochanteric fracture left hip. Reduced and nailed May 5. No postoperative complications. Out of bed on 7th day. Discharged from hospital 9th day. End result good; "out chopping own wood every day".

CASE 6 (FIG. 4)

Aged 64. Fell on floor at University Library, June 1, 1939. Admitted to hospital same day with transcervical fracture right hip. Reduced and nailed on the same day, head in valgus position. Patient out of bed on 4th day, no pain or disability in hip joint. Patient discharged on 10th day completely free of all pain. At some later date patient complained of pain in hip joint and she was x-rayed elsewhere and it was found that nail had slipped. Instead of being reinserted, reconstruction operation was carried out with apparent excellent results. Nail used might have been ½ inch longer.

CASE 7 (FIG. 5)

Insane female patient aged 67. Intertrochanteric fracture right hip. Reduced and nailed in June, 1939. Excellent functional result in spite of no co-operation.

CASE 8 (FIG. 6)

Aged 70. Patient fell on kitchen floor, June 28, 1939. Admitted to hospital same day with per-trochanteric fracture right hip. Reduced and nailed on June 29. Not satisfied with procedure, as nail was not holding sufficient portion of great trochanter. Patient fell out of bed, re-fractured hip and tore nail out of great trochanter. Immediately started suit against hospital and self for allowing such an occurrence. Washed my hands of whole affair. Patient had poor results legally and medically. End result complete failure.

CASE 9

Aged 61. Accident occurred November 2, 1939. Admitted to hospital same day with per-trochanteric fracture, left hip. This was reduced and nailed November 3, head in anatomical position. No postoperative complications. Patient out of bed 5th day, discharged on 8th day. End result good.

CASE 10

Aged 79. Patient fell on floor of kitchen, October 17, 1939. Admitted to hospital October 18 with transcervical fracture left hip. Patient suffering from arteriosclerosis and hypertension. Reduced and nailed October 18, head in slight valgus position. No postoperative complications. Patient out of bed on 4th day, discharged from hospital on 12th day. End result excellent.

CASE 11

Aged 70. Patient fell on floor in house, December 2, 1939. Admitted to hospital same day. Patient unco-operative and difficult to keep clean. Suffering from per-trochanteric fracture left hip which was reduced and nailed on December 8, head and neck in anatomical position. No postoperative complications. Patient out of bed on 10th day. Discharged from hospital on 41st day. Patient died April, 1943, having had an excellent result.

CASE 12 (FIG. 7)

Aged 79. Fell on floor. Admitted to hospital December 21, 1939, with per-trochanteric fracture of right hip. No other injuries or diseases but patient feeble old man and a poor operative risk. The fracture was reduced and nailed with head in varus position, on day of admission. Patient became very violent December 25, remaining irrational for period of two weeks. Developed huge bed sore over sacrum, and gradually went down hill and died.

CASE 13

Aged 62. Insane patient, transcervical fracture right hip. Excellent result. Several months later refractured same hip, attempting to kick another patient and has remained in bed since. No nail picture available.

CASE 14

Aged 71. Patient fell on floor, January 6, 1940. Admitted to hospital same day with basilar fracture of right hip. No other injuries or diseases. Fracture reduced and nailed with head in anatomical position January 6. Wound re-opened June 7 and position of nail changed. P.O.P. spica applied to right hip and leg. Patient discharged from hospital 9th day, in plaster. End result excellent.

CASE 15

Aged 73. Fell on floor July 2, 1940. Admitted to hospital same day with transcervical fracture right hip, which was reduced and nailed July 5, head in slight valgus position. No postoperative complications. Out of bed 4th day. Discharged 8th day. End result excellent.

CASE 16 (FIG. 8)

Aged 69. Fell on floor July 14, 1940. Admitted to hospital same day with transcervical fracture of left hip. Patient has cardio-vascular renal disease. Blood pressure 210/80. Fracture reduced and nailed with head in valgus position, well impacted, July 14. No postoperative complications. Out of bed on 7th day, discharged from hospital on 20th day. Patient has had considerable stiffness in hip. X-ray November 11, 1943, showed "marked decrease in size and flattening of head of femur. There is some evidence of osteo-arthritis of hip joints"; avascular necrosis. Patient walks with considerable limp. End result fair.

CASE 17 (FIG. 9)

Aged 82. Fell down stairway of hospital. Admitted to hospital July 28, 1940, with transcervical fracture of left hip. Patient very stout. Fracture reduced and nailed, July 29, with head in varus position; well impacted. Patient walking at end of 12 weeks. X-ray 1943 due to limp, shows head in slight varus position but no osteoarthritis. End result fair.

CASE 18

Aged 79. Patient fell on floor of home July 29, 1940. Admitted to hospital same day. Badly crippled with arthritis, hands, knees, and hips. Inter-trochanteric fracture left hip. Reduced and nailed July 30 with head and neck in valgus position. No immediate postoperative complications but patient suffered from pain from her arthritis. Out of bed on 21st day. Discharged from hospital on 26th day. Patient says, "My leg and hip function excellently, without pain or discomfort and are every bit as good as the uninjured side."

CASE 19 (FIG. 10)

Aged 54. Fell on icy steps December 17, 1940. Admitted to hospital same day. Sub-capital fracture, right hip, reduced with head in valgus position, December 17. No postoperative complications. Patient out of bed on 7th day, discharged on 14th day. Walked in 9th week. End result excellent.

N.B.—Patient suffered a fracture neck of his left femur six years previous which had also been reduced in valgus position and required nine months' immobilization.

CASE 20

Insane female patient, aged 73. Basilar fracture, right hip. Excellent result in spite of weight-bearing which commenced in the second week after operation.

CASE 21

Aged 56. Fell on street, January 21, 1941. Admitted to hospital same day. Transcervical fracture right hip, reduced and nailed on January 24. No postoperative complications. Out of bed 4th day. Discharged from hospital on 12th day. Weight bearing ninth week. End result good.

CASE 22

Aged 61. Fell on floor of home, January 2, 1941. Admitted to hospital same day. Inter-trochanteric fracture, right hip, reduced and nailed January 2, with head and neck in anatomical position. No postoperative complications. Patient out of bed on 9th day. Discharged from hospital 12th day. Walked in twelfth week. End result excellent.

CASE 23 (FIG. 11)

Aged 65. Fell on icy roadway, February 6, 1941. Admitted to hospital same day. Patient has old Perthes disease or slipped epiphysis of the same hip. Transcervical fracture left hip, reduced and nailed on February 6. No postoperative complications. Patient out of bed on 4th day, discharged from hospital on 10th day. Bearing weight 9th week. End result excellent.

CASE 24

Aged 84. Fell on floor of home, February 7, 1941. Admitted to hospital same day. Transcervical fracture left hip, reduced and nailed, February 8. Hip in anatomical position. No postoperative complications. Out of bed 4th day. Discharged from hospital 9th day. Bearing weight 9th week. End result good.

CASE 25

Aged 55. Fell on floor of home, February 12, 1941. Admitted to hospital same day. Patient has marked neurasthenic tendencies. Sub-capital fracture left hip reduced and nailed February 13, head in valgus position. Out of bed on 4th day, discharged on 8th day. Bearing weight in 9th week. End result excellent.

CASE 26

Aged 72. Fell on floor of home, March 10, 1941. Admitted to hospital same day. Patient suffering from coronary disease. Very difficult to handle in every way. Transcervical fracture, right hip, reduced and nailed on March 13. Patient did not leave bed until May 23. Weight bearing June 6. Died October, 1941, from coronary disease. End result fair.

CASE 27

Aged 61. Fell on floor of home August 27, 1941. Admitted to hospital same day. Suffered from transcervical fracture, right hip, reduced and nailed on August 27, with head in anatomical position. No postoperative complications. Out of bed on 3rd day. Discharged from hospital 7th day. Weight bearing 9th week. End result excellent.

CASE 28

Aged 70. Fell down stairs, November 20, 1941. Admitted to hospital November 22 with transcervical fracture, right hip. This was reduced and nailed November 23, with head in valgus position. Out of bed 4th day, discharged from hospital 5th day. End result excellent.

CASE 29

Aged 66. Fell down stairs December 13, 1942. Admitted to hospital same day. Intertrochanteric fracture of the left hip, reduced and nailed December 15 with head and neck in anatomical position. Out of bed on 4th day. As patient had no one to look after her at home, remained in hospital until 55th day, when she was walking with full weight on leg. End result excellent.

CASE 30

Insane female patient, aged 77. Per-trochanteric fracture, left hip. End result poor.

CASE 31

Aged 79. Fell off truck, February 14, 1942. Admitted to hospital same day. Suffered inter-trochanteric fracture, right hip, reduced and nailed February 16 with head and neck in anatomical position. Out of bed on 7th day. Discharged 13th day. End result good.

CASE 32

Aged 66. Fell on kitchen floor, May 4, 1942. Admitted to hospital same day. Patient apparently injured sacro-iliac joint as she complains of severe pain in this region, also has widespread osteoarthritis. Per-trochanteric fracture of left hip, reduced and nailed and metal plate applied along shaft of femur. Patient was in bed until 45th day and was discharged from hospital on 50th day. End result excellent.

CASE 33 (FIG. 12)

Aged 80. Patient fell on floor, August 24, 1942. Admitted to hospital same day. Patient very obese and showing marked signs of senile dementia. Suffered transcervical fracture of left hip, reduced and nailed on August 27. Nail reinserted October 3. Nail apparently slipped out of head some time during patient's violent actions in bed. Removed December 4. "Neck of the bone subsequently showed complete absorption". Patient never out of bed. Died of pneumonia 159th day in hospital.

CASE 34

Aged 82. Fell on floor January 3, 1943. Admitted to hospital January 13. Transcervical fracture, right femur reduced and nailed, January 18, in anatomical position. No postoperative complications. Patient sitting on side of bed 2nd day. Out of bed on 6th day. Discharged from hospital 9th day. End results good.

CASE 35

Aged 71. Fell on floor December 3, 1941. Admitted to hospital same day. Patient feeble minded. Suffered subcapital fracture of left hip. Fracture reduced and nailed with head in anatomical position December 6. Out of bed on 4th day. Discharged 41st day. Hip x-rayed January 14, 1943. "Nail placed in neck of left femur is still in place and fragment end in good position and alignment. No callus formation. Patient walks with decided limp and complains of severe pain in hip". End result fair.

CASE 36 (FIG. 13)

Aged 58. Fell on floor of home, January 27, 1943. Admitted to hospital same day. Suffering from large left inguinal hernia. Subcapital fracture, left femur reduced and nailed January 27 with head in valgus position. No postoperative complications. Patient out of bed on 7th day, discharged from hospital on 21st day. Patient walks with slight limp and complains of stiffness in joints. End result good.

CASE 37 (FIGS. 14a AND 14b)

Aged 58. Fell on floor of home January 30, 1943. Admitted to hospital same day. Patient has had spastic paralysis right arm and leg since age four. Suffered subcapital fracture right hip, reduced and nailed with head in valgus position, February 1. Out of bed 4th day. Discharged from hospital 15th day. X-ray November 11, 1943, of neck of femur showed marked evidence of absorption. Nail withdrawn. Patient six weeks in bed. Result poor.

CASE 38

Aged 56. Fell on floor of home, February 4, 1943. Admitted to hospital February 7. Transcervical fracture right femur, reduced and nailed February 8, head in marked valgus deformity. Out of bed 4th day, discharged from hospital 19th day. Patient walks without any disability, excellent result.

CASE 39

Aged 65. Fell on floor of home March 19, 1943. Admitted to hospital same day. Transcervical fracture right hip reduced and nailed March 20, with head in valgus position. Patient suffered no postoperative complications. Out of bed on 4th day, discharged from hospital on 11th day. End result excellent.

CASE 40

Aged 70. Fell on floor of home, March 25. Admitted to hospital same day. Suffered transcervical fracture, left hip, reduced and nailed with head in valgus position, marked impaction, March 26. No postoperative complications. Out of bed on 6th day. Discharged on 20th day. End result excellent.

CASE 41 (FIG. 15)

Aged 89. Fell off kitchen chair September 25, 1943. Seen by me on September 29. Patient had temperature of 100°. Very thin, feeble individual. Not a good operative risk. Suffered per-trochanteric fracture, left hip. Fracture reduced and nailed on September 29, with head in anatomical position and marked impaction. Patient improved after operation but due to the feeble condition was not allowed out of bed until 24th day. She suffered pulmonary embolism on 25th day which recurred and produced instant death on the 26th day.

CASE 42

Aged 82. Fell down stairs of home on November 3, 1943. Admitted to hospital November 5. Patient exceedingly and markedly wasted. Intertrochanteric fracture left hip reduced, and nailed, November 8. Patient out of bed on 7th day and at present is doing very well, bearing weight, walking January, 1944.

CASE 43

Aged 75. Fell off chair at home November 3, 1943. Admitted to hospital November 7. Intertrochanteric fracture, left hip, reduced and nailed on November 8 with head and neck in valgus position. Patient out of bed on 5th day. Discharged from hospital 12th day.

CONCLUSION

1. Forty-seven cases of fracture in the region of the neck of the femur are reviewed.

2. Ages ranged from 54 to 89 years, most common in the eighth decade.

3. Nineteen cases or 40% had complications on admission which influenced the end result. This is a very high percentage for such a few cases.

4. Subcapital fracture occurred in 16.2%. Transcervical fracture occurred in 41.8%. Basilar fractures, either inter-trochanteric or per-trochanteric occurred in 41.8%.

5. The fractures were more common in females than in males in the proportions of 83.2%, to 16.7%.

6. End results: good 72.3%, fair 8.3%, bad 8.3%, died 10.6%.

Not illustrated in this report are eight cases. In three of these cases no x-ray plates are available as the operations were not performed in local hospitals. The remainder (five) are cases which have occurred since January 1, 1944, and the end results cannot be assessed. However in those nine cases there was one death, due to coronary thrombosis six weeks after operation. In all cases the immediate result was apparently good as reduction was attained and nailing was satisfactory. Four of these cases are included in the statistics.

I wish to express my appreciation to Dr. R. C. Burr, Radiologist in the Kingston General Hospital, for his kind co-operation, and also to Dr. H. D. Steele for his photographic reproductions.

GUNSHOT WOUNDS OF THE ABDOMEN

(With Report of a Case)

By Captain Douglas Telford, B.A., M.D., R.C.A.M.C.

Vancouver

EVER since the day man first made war upon his adversary the abdomen has been a favourite target of weapons and missiles. Museums contain portions of lumbar spines, their anterior surface pierced by the flint head of some neolithic arrow. In the European war of 1914-1918 between 2 to 3% of all the wounded coming to an organized surgical unit had received abdominal injuries.[1] Raspall of Barcelona estimated, however, that in the air raids of today 9.1% of casualties are abdominal.

Prior to the last war the majority of military surgeons advised conservative therapy for abdominal gunshot wounds. The results of laparotomy unfortunately had proved disastrous.[2, 3] This was the case in the Spanish American War of 1898-99, the South African War of 1899-1901 and the Russo-Japanese War of 1904-05. MacCormac[4] stated "In this (the South African) war, a man wounded in the abdomen dies if he

is operated upon . . .'' Conservative therapy emphasized starvation and large doses of morphine.[5] At the opening of World War I the policy of non-intervention was still the order of the day. It soon became clear, however, that high explosive shells were producing lesions quite different to those obtaining in previous wars and that different lesions required new and different methods of treatment. Leriche,[6] in 1915, advised early operation. Wallace,[7] in 1916, was able to report a study of 1,200 cases of abdominal gunshot wounds most of them having undergone laparotomy. He expressed the changed attitude of the time when he said: ''It is really a question of excluding cases on which it is best not to operate''.

MORTALITY

The mortality rate of abdominal gunshot wounds has always been high both in peace and in war. In the American Civil War a rate of 90% held in 3,690 casualties.[3] In the early part of World War I, when conservative therapy was still the vogue, Leriche[6] reported an 80% mortality.

Following the advent of surgical intervention the rate dropped appreciably. In 1916 Wallace[7] in his study of the abdominal casualties amongst the British Expeditionary Forces reported a total mortality of 60.2% and an operative mortality of 53.9%. In 1936 Oberhelman and Le Count[8] in a series of 343 cases from the Cook County Hospital reported an operative mortality of 61.4%. In 1943 Hamilton and Duncan[9] reviewed 190 cases of gunshot wounds in civilians and reported a total mortality of 51% and an operative mortality of 48.9%. More recently Elkin and Ward[10] reviewed a series of 199 cases, all in negroes, and discovered an operative mortality of 47.2%. Reports from the battlefields of the present war reveal little improvement. MacFarlane[11] stated ''Penetrating abdominal wounds are still accompanied by tragic mortality''. Blackburn[12] estimated a 50% mortality in cases received within 10 to 12 hours from the time of injury.

Multiplicity of perforations and involvement of both the small and large bowel cause an appreciable rise above the average mortality rate. Wallace[14] reported a 74% operative mortality rate in cases so complicated. Infarction or other damage to the large bowel necessitating resection renders the prognosis grave. Gordon-Taylor[15] says about other complications: ''A peritoneum inundated with a flood of highly infective fluid from the intestine, the extraperitoneal tissues or a psoas muscle soaked and sodden with escaping contents render efforts to save the patient fruitless and wasteful of time''. Reports are being received from the battlefields and training camps, however, of such cases being successfully managed. An example of this is, in my opinion, to be found in the following case. When the final analysis of the statistics of this war is forthcoming it is probable that cases presenting all the above complications will be found to have suffered close to an 80% mortality.

CASE REPORT

Signalman F.J.F., aged 26, suffered a .303 rifle bullet wound while on a training scheme at Wainwright, Alberta. The bullet entered his abdomen below the umbilicus and came out through his right buttock. He was transported by ambulance over 12 miles of country road and arrived at the camp hospital one hour from the time of accident.

On admission the patient was suffering from both loss of blood and traumatic shock. His face was pale and beads of sweat stood out on his forehead. His pulse was 98 and his blood pressure 86/60. Immediate resuscitative measures were adopted. These included oxygen, intravenous morphine, 1,000 c.c. of reconstituted serum and 500 c.c. of whole blood. A Miller-Abbott tube, to which was applied continuous suction, was passed into the stomach. The bladder was catheterized. Sixty grains of sulfathiazole were given intravenously.

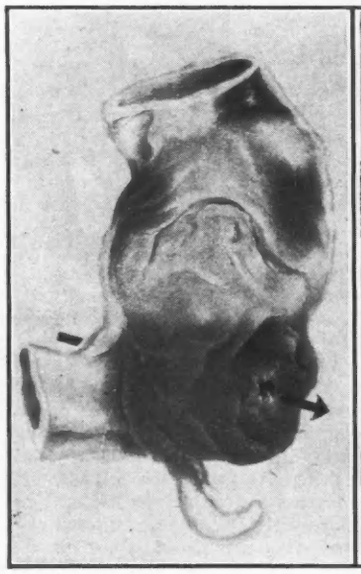
After two hours the patient's general condition was much improved. His pulse had dropped to 64 and his blood pressure had risen to 110/70. The abdomen was resistant and both it and the rectovesical peritoneum were tender. The right leg showed no evidence of nerve involvement nor diminution of blood supply. Urinalysis was negative and hæmoglobin and red blood cell readings were reduced to 70% and 3.5 million respectively. Radiographs showed an irregular fracture hole 1 inch in diameter in the wing of the right ilium.

At this time the man was transferred from the stretcher to the operating table. The abdominal and buttock dressings were removed for the first time and the abdomen was prepared for laparotomy. Oxygen and serum were again administered and anæsthesia was induced with ether.

Operation first stage.—Four hours from the time of accident the operation was commenced. The entrance wound of the missile situated 2 inches below the umbilicus was excised. A long right paramedian incision was made. The skin, rectus sheath and peritoneum showed small puncture wounds but the rectus muscle showed an irregular gap 1 inch in width. On incising the peritoneum free gas escaped and 8 ounces of blood, succus entericus and fæces were found free in the peritoneal cavity. This mixture was removed as well as possible by aspiration and gentle sponging.

Examination of the small bowel revealed four perforations at the jejuno-ileal juncture. Each perforation was closed by two layers of sutures placed so as to plicate the bowel transversely. Examination of the large bowel revealed extensive damage. The cæcum was perforated anteriorly in the ileocæcal region. It was completely blackened and obviously in a state of infarction. The proximal half of the ascending colon showed several areas of hæmorrhagic extravasation. The retroperitoneal space about the cæcum was the seat of a large hæmatoma which had elevated the parietal peritoneum for several inches. The terminal ileum, cæcum and proximal half of the ascending colon were mobilized. This procedure made evident the posterior perforation of the

cæcum, the laceration of the ilio-psoas muscle and the gross contamination of the retroperitoneal tissues. The devitalized fibres of the ilio-psoas muscle were excised and the bulk of the fæcal contamination was removed. The greater part of the raw area from which the large bowel was mobilized was successfully peritonealized but unfortunately in the region of the damaged ilio-psoas the peritoneum was found to be deficient. Here the raw surface was protected by a rubber dam obtained by folding Penrose drains. The ends of these drains were drawn through a stab incision in the loin. The cut end of the ileal mesentery was sutured to the lateral peritoneal wall and the two loops of intestine were approximated by suturing several appendices epiploicæ to the mesentery of the ileum. The mobilized bowel was exteriorized and Payr's clamps were placed across both the ileum and colon at a level superficial enough that one inch of each loop projected beyond the skin surface. The exteriorized ileo-colic segment was then resected. The peritoneum was closed about the loops and all other layers of the abdominal wall were approximated with stay sutures over a strip of vaseline gauze laid between the skin edges.



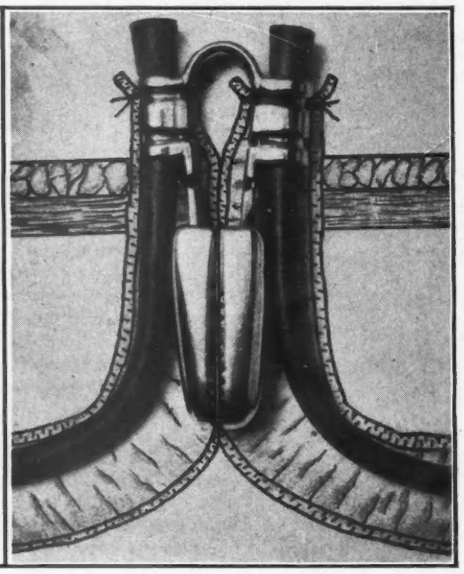


Fig. 1 Fig. 2

Fig. 1.—The ileum, cæcum and colon removed at operation. An arrow indicates the posterior perforation of the cæcum and the path of the missile. The darkly shaded areas indicate the infarction of the cæcum and the hæmorrhagic extravasation into the colon.

Fig. 2.—This illustrates the use of the special enterotome. The jaws of the enterotome are seen applied to a deep segment of the ileo-colic spur. The loops are shown tied tightly about the enterotome and catheters which indwell the loops are shown engaged into the sleeves of the enterotome.

The buttock operation included complete wound excision, extraction of loose bone fragments and packing the wound with vaseline gauze.

Postoperative treatment.—General therapeutic measures included: morphine gr. ¼ q.3 to 6h. until auscultation of the abdomen revealed intestinal sounds; oxygen continuously by mask as long as cyanosis was present; changing the position of the patient, encouraging and assisting him to cough forcibly and aspirating the bronchial tubes; continuous suction applied to a Miller-Abbott tube advanced to the upper ileum. This was continued until the patient was taking more fluids by mouth than were being removed by suction. Administration of parenteral fluids included 40 litres of glucose and saline, 10 litres of amino acid and glucose solution, 5 litres of reconstituted serum and 5 litres of blood. In these fluids 1,000 gr. of sulfathiazole were dissolved.

MINOR SURGICAL PROCEDURES

On the fourth postoperative day the Payr's clamps were removed from both loops and a special enterotome was applied to the deep segment of the spur. The loops were then tied tightly about indwelling catheters. To the proximal catheter was applied continuous suction and into the distal catheter was instilled, by the Murphy drip method, part of the aspirated succus entericus. On the eighth day the loops were retied about the catheters at a deeper level in order to prevent any leakage about them. On the twelfth day the enterotome and catheters were removed because the ileocolostomy had already been established by the crushing action of the enterotome. This was proved by the passage of gas and fæces by rectum 2 days previously and was confirmed, after removing the enterotome, by the palpation of a window in the depths of the spur. The patient was then placed prone on the canvas sling of a fracture bed. The ileostomy was centred over a hole in the canvas and the bowel content discharged to a receptacle below. A circular air cushion added considerably to the patient's comfort. On the 14th day the colostomy was closed as securely as possible by inverting its margins with two rows of sutures in the hope that at least partial success would be the reward of such a premature closure. The ileostomy was similarly closed and tightly tied around an indwelling catheter. The fascia and skin margins were approximated by stay sutures over the inverted bowel except where they embraced the catheter and a strip of vaseline gauze. Continuous suction was applied to the catheter in order that the freshly closed wound might be saved exposure to the succus entericus. On the 18th day slight leaking was evident, so the catheter was removed and the patient was again placed prone on the canvas sling over the fæcal receptacle.

Progress following first stage.—For the first two days the patient's state was precarious but immediately following progress was consistently favourable. At the end of two weeks the patient was able to sit on the side of the bed and enjoy a high caloric low residue diet with added vitamins and minerals. Bowel movements were occurring by rectum, but half the bowel content was still escaping by the enterostomy. At the end of four weeks the patient had gained considerable weight and strength and was able to sit in a chair. Bowel movements were normal by rectum but through the enterostomy there escaped several ounces of semi-formed stool daily. At the end of five weeks the enterostomy was reduced to a hole ¼" in diameter and intermittently through this passed only a trickle of soft stool. Unfortunately by this time the patient had suffered 2 days of intermittent periumbilical pain which had given way to a constant ache. The temperature, pulse and blood count had begun to rise. A diagnosis of ileal obstruction was made.

Operation—second stage.—Five weeks from the time of the original operation the patient was again submitted to operation. The old laparotomy incision was reopened down to the peritoneum. The tract of the ileo-colic fistula was excised and the anastomosis between the ileum and colon was completed by inverting and oversewing the fistulous opening. The region of the anastomosis was freed from its parietal attachments and the suture line was reinforced with adjacent appendices epiploicæ. The abdomen was opened and the terminal ilium for a distance of four inches was found to be

firmly adherent to the damaged ilio-psoas muscle. The bowel proximal to this area was greatly distended and distally it was collapsed. An enterenterostomy was performed to short-circuit the obstruction. The peritoneum was closed with chromic catgut and all other layers of the abdominal wall were approximated with stay sutures over a strip of vaseline gauze laid between the skin edges.

Progress following second stage.—At the end of one week the patient was enjoying a soft diet; gas and fæces were passing normally by rectum. At the end of three weeks that is eight weeks from the time of injury, he had gained 20 pounds in weight and was able to walk with little effort. Both the laparotomy and buttock wounds were well healed.

DISCUSSION

This case was extremely interesting to me for several reasons:

First: the amount of damage that can be caused by a .303 bullet. In this case there were four perforations of the small and two perforations of the large intestine, infarction of the cæcum, hæmorrhagic extravasation into the ascending colon, retroperitoneal hæmatoma, fæcal contamination of both the intra- and extraperitoneal tissues, destruction of muscle, fragmentation of bone and loss of blood.

Second: the need of adequate and appropriate surgical intervention. In this case four perforations of the small bowel were repaired. The cæcum and first part of the ascending colon were removed by an exteriorizing resection. Military surgeons[12, 13] agree that exteriorization with colostomy is the guiding principle in dealing with wounds of the colon. The abdominal cavity was cleaned by aspiration and swabbing. The raw surfaces were peritonealized as well as possible or covered by a rubber dam. The contaminated extraperitoneal tissue was drained through a stab incision and an excision of devitalized muscle was effected.

Third: the great amount of pre- and postoperative treatment necessary to keep the mortality and morbidity at a minimum. Most important is the anticipation of possible complications and the adoption of methods to prevent them. In this regard, special mention should be made of the advisability, in cases subjected to an exteriorizing resection and in which the proximal loop is small intestine, of conserving the succus entericus and protecting the fresh laparotomy incision. Surgeons who have seen patients dangerously weakened by the complete loss of the succus entericus through an enterostomy will have a real appreciation of the former. Others[16] who have observed the digestive action of the succus entericus on a fresh laparotomy wound and who have witnessed a complete opening up of the same wound down to the peritoneum, know too well that healing by primary intention of a wound so exposed is the exception rather than the rule.

A method, therefore, which facilitates the early transfer or passage of the succus entericus from the proximal to the distal loop, and which keeps the succus entericus away from the fresh laparotomy incision is highly desirable. In this case the method employed was successful in both these regards. As early as the fourth postoperative day the succus entericus was being transferred from the proximal to the distal loop. As early as the tenth day the succus entericus was passing freely enough through the newly formed ileocolostomy that gas and fæces were passed by rectum. For the first 12 postoperative days the wound remained uncontaminated by the succus entericus and probably because of this it healed by primary intention. To my knowledge the method used was unique in that the loops were tied tightly about indwelling catheters immediately after the enterotome was applied to the ileocolic spur. The enterotome which made this possible was designed by the writer.

Here, too, should be mentioned the need of recognizing complications early and of adopting promptly methods to combat them. In this case the only major complication was the small bowel obstruction which developed in the fifth postoperative week.

CONCLUSION

In reporting this case of gunshot wound of the abdomen I am fully aware of the ideal conditions under which it was handled. The first aid treatment was prompt and adequate. The transportation by ambulance was effected without delay and the facilities for preoperative, operative and postoperative treatment were complete in every detail.

A full realization of the importance of these facts makes one very humble in view of the excellent results being obtained by advanced surgical units on the battlefield. At these centres such cases are operated upon and if possible, retained until the tenth postoperative day[12] under circumstances less favourable than those at the Wainwright Camp Hospital.

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REDUCTION OF POSTERIOR DISLOCATION OF ANKLE COMPLICATED BY FRACTURE OF DISTAL END OF TIBIA AND FIBULA

By Gordon E. Perrigard, B.A., M.D., C.M.

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SURGICAL textbooks vary among themselves and are often extremely indefinite as to methods for the reduction of fracture dislocations in the region of the ankle joint. The object of this paper is to describe one very simple method applicable to this type of condition.

A posterior dislocation of the ankle, complicated by an external rotation fracture of the lower end of the tibia and fibula, may be reduced into excellent apposition by employing a simple hold, which is well known in jiu-jitsu.

Figs. 1 and 2 represent x-rays of a left ankle in such a case immediately following injury. The fractures and dislocations are obvious.

METHOD OF REDUCTION

The patient was given a general anæsthetic. Then, with the patient lying flat on a table, the operator took up a position at the left side of the patient's left foot (Fig. 5). The ankle was placed snugly in the bend of the operator's left elbow and gripped firmly by flexing the forearm. The left hand was closed in a fist and pronated so that the radial edge of the forearm pressed in against the medial aspect of the ankle. Then, the ulnar border of the operator's right wrist was placed down against the anterior aspect of the patient's leg, about three inches above the ankle joint, and its radial edge was fitted snugly against the ulnar border of the left wrist.

The left wrist is first tilted back towards the operator's left shoulder, and then the right wrist is pressed against it so that when the left wrist is forced forward and down, it, in turn, levers the ulnar edge of the operator's right wrist down against the patient's leg. There is also a pushing up towards the patient's groin with the right wrist in this action which replaces counter-traction.

The right forearm is placed almost horizontally against the patient's leg, naturally above the site of the fracture, in order to press the proximal bone in a posterior direction. The stiffened out left wrist of the operator is pressed down against the radial-border of his right wrist in order to force the ulnar edge of his right wrist down against the leg. The wrists must be held stiffly and out straight.

With the feet well braced, traction and anterior elevation is exerted with the left elbow bend grip of the ankle, which controls the distal fragments and the dislocation. This grip also clamps, vice-like, about the displaced distal fragments of the tibia and fibula, and in this case, it replaced the lateral displacement of the fibula (Figs. 2 and 4).

Constant traction is exerted while the several other forces are applied. The left wrist forces down against the right wrist, which in turn, levers down the proximal ends of the bones of the ankle. Meanwhile, on the distal end of the fractured bones, there is an upward lift and distal traction by the operator's elbow bend. To assist traction, the operator may twist a little to his left, keeping his feet firm, and turning just by the waist.

While the description of this method of reduction may at first appear to be a little complicated, the illustrations will make it clearer, and its application, once mastered, requires about thirty seconds.

If circumstances occur under wartime conditions when it is impossible to give a general anæsthetic, the patient may flex the knee in order to relax the gastrocnemii muscles, and he should pass his forearm, on the side injured, under his knee and grasp the wrist with his other hand, so as to pull his knee back during the reduction of the fracture-dislocation of the

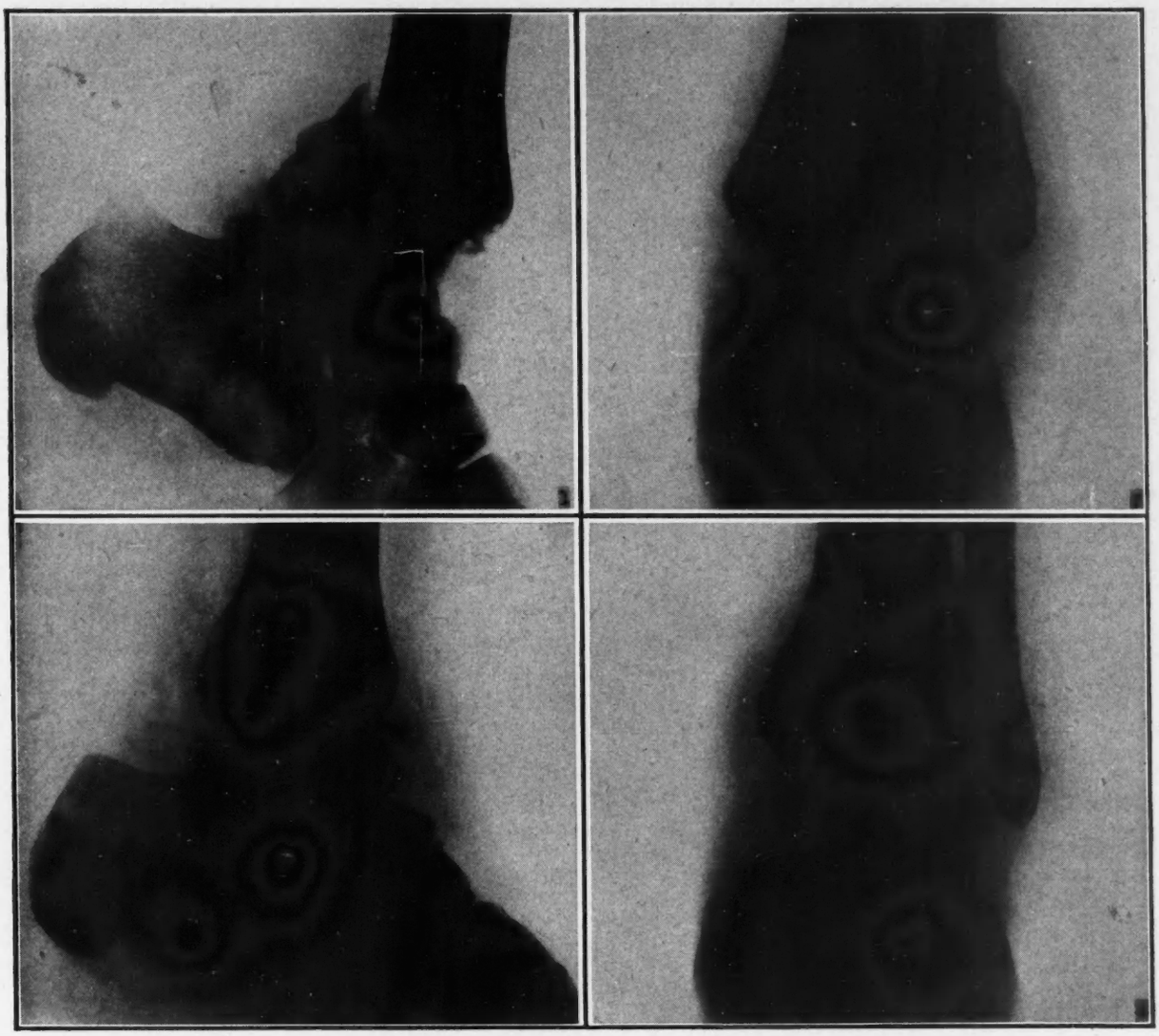

Fig. 1.—Lateral view of ankle following injury. There is a posterior dislocation of the ankle, complicated by fracture of the distal end of the tibia and fibula. **Fig. 2.**—Antero-posterior view of the ankle following injury. A lateral displacement of the distal end of the fibula is obvious here. **Fig. 3.**—Lateral view of the ankle following reduction. The posterior dislocation has been reduced. A small piece of evulsed tibia is visible. **Fig. 4.**—Antero-posterior view of the ankle following reduction. The lateral displacement of the distal end of the fibula has been reduced, as well as the posterior dislocation.

ankle. Local anæsthesia, if available, can be used with good effect. Good results have been obtained with a 2% solution of procaine chlor. with 0.5% chlorbutal.*

The superb simplicity of this method is an advantage. It proposes a definite method of treatment, whereas up to the present time, methods have been loose and vague. The ease with which it can be used, and the excellent results obtainable are obvious. It is not attended by any special dangers or contraindications. As soon as the dislocation of the ankle is reduced, the foot can be easily dorsiflexed.

* Supplied by DesBergers-Bismol.

SOME ANATOMICAL CONSIDERATIONS

In this type of injury, there may be quite a strain on the deltoid ligament, but frequently it will evulse a tiny piece of the tibia before it tears itself (Fig. 3). Certainly, the fibres of the ligament get somewhat pulled apart and extracted to a certain extent from their previous relationships like the fibres of cotton-wool pulled slightly.

The anterior ligament of the ankle joint is frequently torn. The interosseous ligament between the tibia and the fibula generally remains intact, as it has some stretching power normally. There may be some stretching of the peroneal tendons. The transverse tibio-fibular ligament and the posterior talo-fibular ligament may be

torn or stretched. The anterior talo-fibular ligament of the ankle is generally very little affected. The calcaneo-fibular ligament of the ankle is occasionally torn. There is also possibility of some bruising of the articular surface of the body of the talus.

Therefore, just setting the dislocation-fracture correctly is not all that one has to worry about. Treatment from then on is very important. A properly applied plaster cast, with the foot slightly dorsiflexed and perhaps a little everted,

Fig. 5.—Method of reduction. The *left* ankle is placed in the *left* elbow bend. Here the left fist forces down against the right wrist, which is levered down against the leg proximally to the fracture, and the elbow bend grip clamps and elevates the foot distal to the fracture-dislocation. Traction and counter-traction is easily obtained.

is essential, and some physiotherapy later may be indicated in very severe cases.

There is a certain amount of individual logic which has to decide the details of treatment of individual cases, since rarely are any two cases exactly alike. However, I generally apply the cast from the metacarpo-phalangeal joints to above the knee.

Naturally, the usual precautions should always be taken against cast pressure over bony prominences, and the degree of swelling present or expected should be taken into consideration. Loose casts should be replaced. Tight casts should never have been so applied. It is customary to cut a line down the cast while it is moist to facilitate removal. It may be bivalved.

A vaseline-lubricated length of rubber tubing may be placed against the skin or against a stocking which may be worn before the cast is applied. When the tube is pulled out, it leaves a channel for the jaw of the plaster cutter to follow easily. Circulation should be checked by inspection of the toes. The patient should exercise the toes regularly. The lateral edge of the little toe should be well padded, as well as the superior edge of the cast. If the cast remains snugly in place for two to three months, I recommend removing the cast gradually by cutting off two or three inches of the upper part at a time, bringing flexion of the knee into play before the ankle is free of the cast. A heel is generally incorporated in the cast, with a rubber heel being easily applied while the cast is moist. The foot should remain elevated following the application of a cast in order to reduce tendency to swelling in the dependent foot.

Since originally describing this method, it has been used successfully on similar cases.

Appreciation is extended to Dr. C. P. Martin, Professor of Anatomy, and to Dr. D. S. Forster, Assistant Professor of Anatomy of McGill University for their kind assistance in preparing this paper.

RÉSUMÉ

Présentation d'un procédé simple,—inspiré du jiu-jitsu,—pour réduire la luxation en arrière du cou-de-pied, quand cette luxation se complique d'une fracture avec rotation externe de l'extrémité inférieure du tibia et du péroné.

Cette réduction est entreprise après anesthésie générale, de préférence, ou anesthésie local au besoin.

Le procédé, bien illustré par la photo ci-contre, se résumé ainsi: le cheville gauche est placée dans le pli du coude gauche. Le poing gauche appuie contre le poignet droit qui est abaissé en appuyant sur la jambe un peu plus haut que la fracture tandis que le coude se resserre et élève le pied au dessous de la luxation et de la fracture. Les tractions et les contre-tractions sont facilement obtenues. Le plâtre est placé selon la technique habituelle à laquelle quelques innovations sont ajoutées.

JEAN SAUCIER

SMALL BOWEL OBSTRUCTION DUE TO AN UNATTACHED SECONDARY TUMOUR

By R. F. Warren, B.Sc., M.D.

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THE following case is reported because it presented an unusually acute onset of metastatic complications in the small bowel and because of its unusual nature as a loose tumour within the lumen of the bowel. It was of interest also in that there were multiple secondary growths from an unknown primary site.

Secondary carcinoma of the small bowel is not particularly uncommon. The primary sites are usually large bowel, stomach, or rectum. In carcinomatosis peritonei implantations find a

favourable environment on its serosal surface. Spread of carcinoma to the small bowel may be by blood stream, by lymphatics, or by direct infiltration. The process here was uncertain. In the absence of a complete autopsy it is not thought to have originated in the small bowel.

CASE REPORT

The patient was a white male, 67 years of age. The chief complaints were loss of appetite for ten days, nausea and vomiting for seven days, abdominal distension for five days.

History of present illness.—The patient was in good health till December, 1943, at which time he was confined to bed with a mild attack of acute influenza. During his stay in bed he complained of a vague abdominal discomfort. Within two weeks he had recovered from his respiratory disease, but had a persistent anorexia. Believing this to be related to his recent acute infection, his physician prescribed a mild tonic. Shortly after the first dose of this medicine he began to vomit violently. On examination he was found to be slightly distended. The physician, suspecting an intestinal obstruction, advised admission to hospital. This the patient refused and shortly afterwards left the city. In a neighbouring town he was seen by another physician a few days later, still vomiting, and still acutely ill. He was finally prevailed upon to return to this hospital, and was admitted seven days after the onset of vomiting.

Past illnesses.—He had had a cough for years associated with harsh basal râles; also he had suffered from chronic arteriosclerotic heart disease for the past three years. Apart from this he had been in good health and had never had any serious illnesses.

The functional inquiry was entirely negative.

Physical examination, December 23, revealed a rather thin old man. The abdomen was moderately distended and visible peristalsis in the small bowel was seen easily. A movable mass about the size of a hen's egg was palpated in the abdomen. By changing the position of the patient it could be made to appear anywhere from the R.L.Q. to the L.U.Q. There was some dullness in the lower lobe of the right lung anteriorly with accompanying râles. Because of this and the fact that the obstruction appeared to be incomplete operation was delayed.

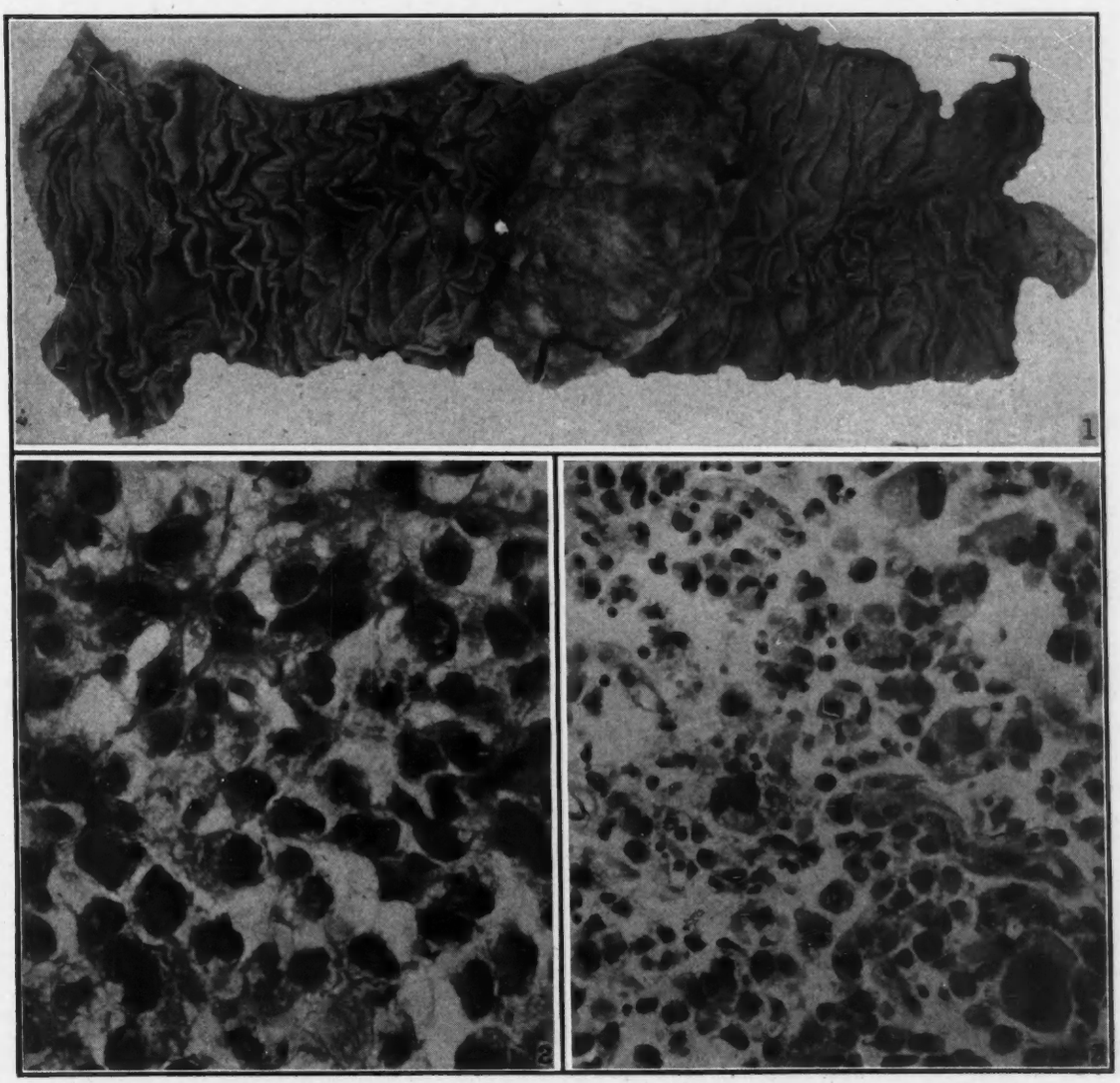


Fig. 1.—Section of small bowel removed at operation December 28, 1943, showing large fungating tumour attached to mucosal surface. Smaller tumour is also seen lying a few centimetres away. **Fig. 2.**—Section through large tumour. Cells of varying size and shape, deeply staining nuclei, some mitotic figures. Nucleoli are seen. **Fig. 3.**—From smaller tumour of December 28, 1943. Many mitotic figures, strongly suggest the architecture of a malignant melanoma; giant cell seen in one corner.

The temperature was 97.4° on admission, pulse 84, and respirations 20.

Course and treatment.—He was placed on intravenous saline; a Miller-Abbott tube was passed into the duodenum and suction applied. He showed some signs of improvement for five days, during which he received chemotherapy for his pneumonia. At this time he complained of sudden severe crampy abdominal pains and a large mass was felt in the epigastrium. Immediate operation was decided upon.

On December 28, 1943, under spinal nupercaine anæsthesia the abdomen was opened and the tumour identified. It consisted of an intussusception of small bowel into small bowel over a distance of 15 to 20 cm. which was easily reduced by gentle pressure from below. The cause of this was found to be a tumour mass within the bowel (jejunum) and attached to the bowel wall. About 20 cm. of small bowel were resected and proximal and distal portions joined by a side-to-side anastomosis.

At operation there was observed a marked peristaltic activity of bowel both above and below the site of obstruction. So great was this activity that at one point an intussusception formed over the anastomotic stump while the peritoneum was still exposed.

In the following two weeks he made a slow but uneventful recovery, to the point that he was sitting up in bed, enjoying a soft diet and had had the stitches removed. On January 17, 20 days postoperatively, he complained of nausea again. Shortly afterwards he developed cramp-like abdominal pains and in the evening of that day began to vomit a foul, brown, fæcal material. The following day there was no doubt but that he was suffering from another acute small bowel obstruction. Operation was advised at once.

Under spinal nupercaine anæsthesia the abdomen was opened again and a large intussusception found similar to that seen three weeks before. About 35 cm. of small bowel were resected. The cause of the intussusception was found on opening the resected portion. Lying within the lumen was a large free unattached tumour about the size of a goose egg. No sign of attachment was found on tumour or bowel.

Following the second operation the patient rallied slightly for the first couple of weeks, but despite all attempts at intravenous feeding and relief of distension by suction he became worse and died on February 4, 38 days after admission.

Unfortunately permission for autopsy was denied.

Laboratory findings.—On admission hæmoglobin was 78%, white blood cells 14,300, red blood cells 3,700,000 and colour index 1.0. Differential white count showed neutrophils 90%, lymphocytes 7%, and monocytes 3%.

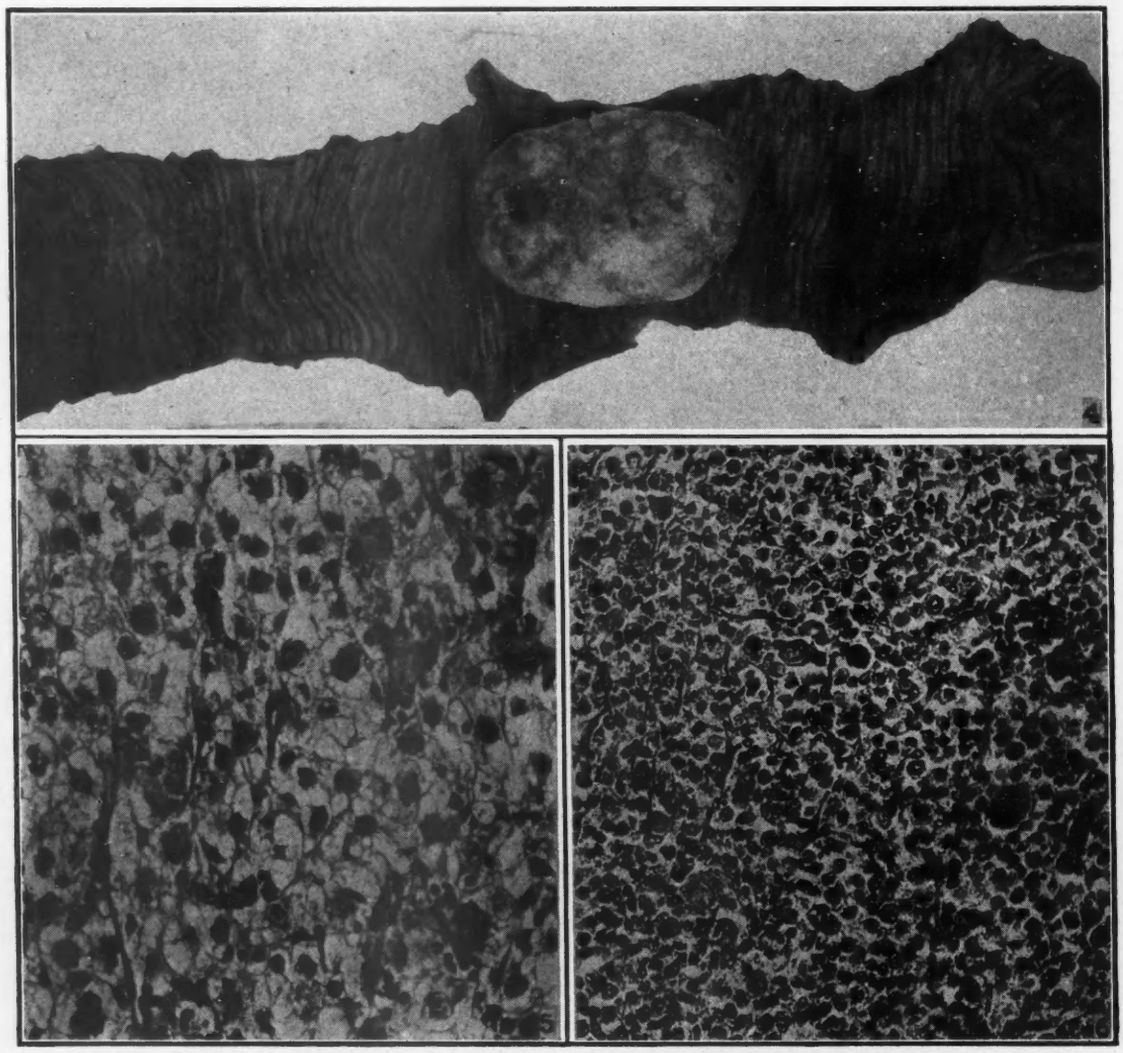


Fig. 4.—The loose tumour is lying freely within the lumen of the bowel. No site of attachment is visible on tumour or bowel wall. **Fig. 5.**—Cells supported by a fine reticulum, bearing an intimate relationship to the cells themselves. Many mitotic figures and marked variation in size and shape of cells. **Fig. 6.**—Section through secondary small tumour in specimen of January 18. Note dense stroma, fibrous strands supporting wildly proliferating cells. Giant cells are seen.

The soluthiazole level in the blood was kept between 4.5 and 8.2 mgm. % during the time he received chemotherapy. His urine was consistently negative. The non-protein nitrogen did not exceed 33 mgm. at any time.

PATHOLOGIST'S REPORTS

1. *Specimen removed at operation, December 28.*—The gross specimen consisted of approximately 21 cm. of small bowel measuring 10 cm. circumference on the average (see Fig. 1). In the strip of mesentery were several large firm lymph nodes. Within the lumen of the bowel was a pedunculated tumour attached to the mucosal surface and measuring approximately 8 x 5 x 3 cm. The pedicle measured approximately 6 cm. of the circumference and 1 cm. of the longitudinal direction of the bowel. The tumour itself was nodular and the colour varied between pink, green and yellow. About 6 cm. from this pedunculated tumour was found a second growth which was a nipple-like structure, measuring approximately 1 cm. in diameter, and extending a distance of about 1.3 cm. above the surrounding mucosa of the bowel. It was rubbery in consistency. The external surface was yellow. Cut surface of this second tumour was yellow and appeared to extend from the submucosa inwards, and did not appear to involve the muscular or serosal coat.

Microscopic sections through the large tumour showed it to be made up of cells of varying size and shape (Figs. 2 and 3). Nuclei were extremely deep staining, and varied greatly in size. There were occasional mitotic figures and almost all the cells showed nucleoli. There were varying amounts of cytoplasm. In some areas there were considerable amounts of mucoid material, while in others the cells were arranged in masses supported by a reticulum of fibrous tissue. In yet other areas this fibrous tissue reticulum extended between the cells in a more intimate relationship. Part of the tumour showed gross ulceration on the surface.

Sections throughout the smaller tumour showed many more mitotic figures than those in the larger tumour. The cells were arranged in masses which were supported by a rather fine reticulum. Some areas strongly suggested a malignant melanoma but a diagnosis was made of "secondary carcinoma, primary site unknown".

2. *Specimen removed at second operation, January 18.*—The gross specimen consisted of a length of small bowel measuring approximately 35 cm. in length and approximately 6 cm. in circumference (Fig. 4). The external surface was pinkish grey in colour, smooth, and glistening. In the central portion of the bowel was a mass which measured 6 x 6 x 8 cm. and 5 cm. distal to this was a firm round nodule in the serosal surface about 0.5 x 1 cm. in size. The tumour mass which was palpated externally was found to be lying loosely within the bowel. It was slightly doughy in consistency and greyish-green mottled in colour. There was no evidence on the bowel wall of any source of attachment for this tumour.

Microscopic examination of these two tumours (Figs. 5 and 6) showed them to be extremely similar to the tumours removed at the first operation, December 28. They consisted of large atypical cells of varying size and shape, with extremely large deep-staining pleomorphic nuclei. Numerous mitotic figures were seen. In some areas the cells were lying in columns and clumps, supported in some instances by a fine reticulum intimately related to the cells. There was a marked variation in size of the malignant cells and many of them showed almost giant-like properties. In many respects the tumour resembled a Hodgkin's tumour. The general pattern was not quite typical. The possibilities of a seminoma and a malignant melanoma were ruled out. Diagnosis was again made of "secondary carcinoma".

DISCUSSION

On reviewing the case one is struck by the complete absence of symptoms usually associated with malignant disease, *e.g.*, loss of weight, loss of energy, and loss of appetite. Further, very few symptoms referable to the masses were discovered at the operations.

In regard to the loose tumour within the bowel little can be said in view of the lack of autopsy. One's first thought was that perhaps this was a piece of the original tumour removed at first operation. But closer examination revealed the tumour to be fresh, the cells viable under a surface of necrosis. A tumour of three weeks' vagrancy would have disintegrated.

We must conclude therefore that this must have become detached from above when the dilated portion of small bowel regained its normal size and tonicity. The multiple nature of the disease with several small tumours in the submucosa suggest secondary invasion.

Seminomas were ruled out by an A-Z test, and melanoma by chemical investigation. Physical examination failed to give any clue of the primary site.

SUMMARY

This is the case of a 67 year old man with no previous history of gastro-intestinal disturbances who suddenly developed incomplete and later complete small bowel obstruction. At operation a large fungating tumour of jejunum and a small submucous tumour were removed. Three weeks later the patient again developed a complete small bowel obstruction. This time a large loose tumour within the lumen of the ileum was removed. Secondaries were also removed again.

The exact nature of the tumours is unknown. Presumably they are secondary adenocarcinomas from an undisclosed primary site.

I wish to thank Drs. R. Janes and J. Chassels for permission to publish this case, and Prof. W. Boyd for the photographs of specimens.

In the minds of the public, lack of energy tends today to mean lack of vitamins. Our experience lends no support to the theory that vitamin deficiency seriously affects the health of a large percentage of the population.—F. N. Allan, The differential diagnosis of weakness and fatigue, *New England J. Med.* **231**: 414, 1944.

ELBOW FRACTURES

By Captain J. D. Stenstrom, R.C.A.M.C.

END-RESULTS of fractures at the elbow are not good. These injuries are frequent, particularly in children. Better results can be obtained by prompt and proper treatment at the time of injury. Poor results will continue to follow delayed and improper treatment.

During a six-month period at the Army Reception Centre a study was made of all recruits who stated they had had an elbow injury. The results were striking: 213 men gave a positive history of injury and 97 had disabled, deformed elbow-joints. The average age at the time of injury was 13 years. In only 9 instances was the individual over 20 at the time of injury. The average age at the time of examination was 28 years. The accompanying table lists the elbow findings.

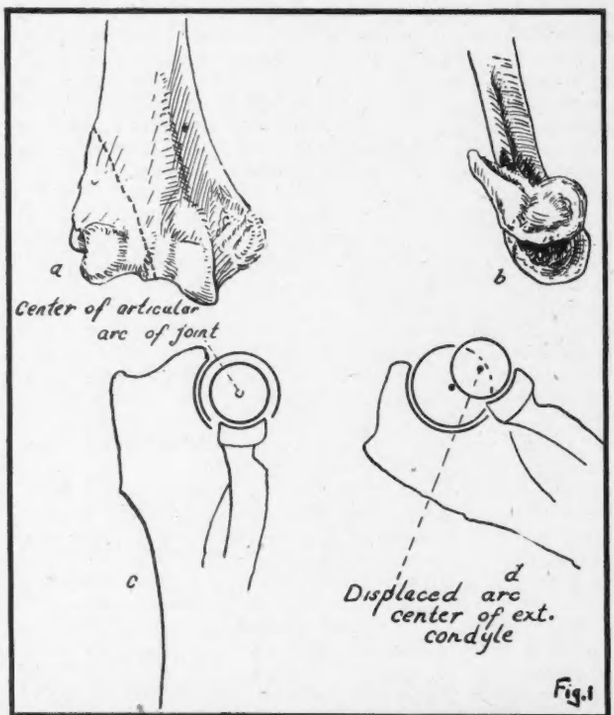
TABLE I.

SHOWING POSITIVE FINDINGS IN DISABLED ELBOWS

Positive finding	*Number of cases*
Positive finding of injury	213
Disabled and deformed elbows	97
Cubitus varus	45
Pain	34
Limitation of extension	33
Limitation of flexion	29
Cubitus valgus	28
Traumatic arthritis	24
Malunion supracondylar fracture	20
Limitation of flexion and extension	17
Non-union condyles, epicondyles, olecranon	15
Surgical operations	11
Malunion fractures head and neck of radius	10
Crepitus	9
Limitation of pronation and supination	8
Delayed ulnar palsy	5
Complete ankylosis	4
Myositis ossificans	3
Bone fragment included in joint	3
Unreduced posterior dislocation	1

One of the principal reasons for these poor results is incorrect diagnosis. The nature of the lesion is missed or misinterpreted. In order to evaluate the significance of elbow lesions in childhood the appearance of the normal joint during the growing period should be appreciated. In all instances a comparative view of the opposite elbow is invaluable. The epiphyses of the lower end of the humerus have a definite position in relation to the shaft. The roentgenogram in early youth cannot possibly supply all the necessary information. An epiphyseal fracture prior to ossification will not be demonstrated. The lesion may incorrectly be labelled sprain or contusion. The stage is set. With growth a progressively increasing elbow deformity reveals the true nature of the original injury.

Restriction of elbow movement after injury is due to capsular contraction or bone block. The forearm bones travel as a unit on similar curves around the lower end of the humerus. If there is a lower humeral fracture with displacement of either the capitellum or trochlea the arcs of the two curves are changed. Elbow



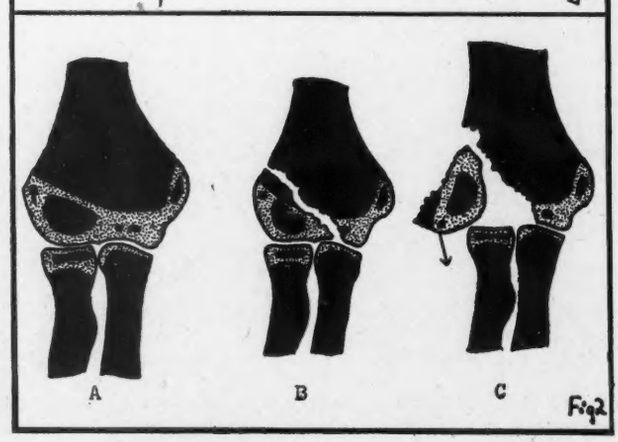


Fig. 1. — Diagram demonstrating the reason for blocking of flexion or extension in fractures around the elbow. If the two arcs of rotation of the radius and ulna are thrown into eccentric position, there will be a blocking of flexion or extension, or both. Careful lateral views are necessary. (From P. B. Magnuson: *Fractures*, 2nd ed., Revised, p. 109, 1936.)

Fig. 2.—(A) The epiphyses at the elbow-joint. (B) External condylar fracture (separation of external condylar epiphysis). (C) Displacement of the condyle by the extensor pull. (From Watson-Jones, *Fractures and Joint Injuries*, 3rd ed., vol. 2, 1943.)

motion is restricted not by any bony block but because the ligaments and capsule are thrown into a twist (Fig. 1)[1]. The elbow-joint is very susceptible to trauma and reacts by adhesion formation and capsular contraction. The repeated minor injuries associated with articular surface irregularities; the presence near the joint of metallic foreign bodies; the passive "forcing" of the joint, are notorious in causing capsular contraction.[2] Restriction of elbow movement due to bone-block occurs following malunion of any elbow fracture. This is due to a change in the axis of one of the articular surfaces.

Carrying angle alterations were very common in this series. Cubitus varus and valgus are associated with elbow weakness and diminished hand precision. Cubitus valgus is frequently followed by delayed ulnar nerve palsy.

SUPRACONDYLAR FRACTURE

Supracondylar fracture of the humerus is pre-eminently a childhood injury and is seldom sustained after 20. The majority of cases occur before the age of 10. It is the most common fracture about the elbow in youth.[3] Actually it is not a fracture of the elbow-joint but if improperly treated joint disability will ensue. For this reason most writers consider it with the fractures that enter the joint. The fracture occurs at the flattened-out portion of the lower end of the humerus at the point where it takes a distinct forward bend. The plane of fracture extends across the bone and is higher on the posterior than on the anterior surface. The lower fragment is back and may lie directly posterior, postero-medial or postero-lateral. The trauma is received with the arm in extension, the commonest cause being a fall on the outstretched hand.

Occasionally the injury occurs with the elbow in flexion. In this case the plane of fracture is oblique in the opposite direction and the lower fragment is displaced forward. The fracture line may extend across the bone at the level of the condyles just above the epiphyseal line. At this site it involves the olecranon and coronoid fossæ (dicondylar fracture). The lower fragment includes all the articular surface and usually the internal epicondyle. All gradations between the typical supracondylar and the typical dicondylar fractures may occur. Most authors do not distinguish between the two types. The dicondylar lesions deserve special mention because the fracture line is intra-articular and the callus may interfere with elbow movement.[4]

It has been a common practice to speak of separation of the lower humeral epiphysis. The frequency of this lesion has been seriously questioned. Careful roentgen studies on a large series demonstrated that such a separation is rare. A greater or less portion of the diaphysis is usually carried away with this epiphysis.[5] Fracture of the external condyle accounts for many of the cases of so-called epiphyseal separation as most of the epiphysis is included in this condyle.[4] Properly speaking all such lesions are supracondylar or external condylar fractures.

Future elbow function demands that reduction be accurate. Extension of the normal joint is limited by a bone-block, the locking of the olecranon in the olecranon fossa. If the fracture has united with forward tilting of the lower fragment there will be limitation of elbow extension. The degree of restriction depends on the amount of tilt. The extension loss is permanent as it is due to the normal ulno-humeral block. Backward tilting, by a similar mechanism, causes a permanent limitation of flexion. Malunion with lateral or medial tilt or rotatory displacement causes carrying angle alterations. It is a common misconception that growth corrects these displacements. Except in very young infants they are not corrected by subsequent growth of the bone. Limitation of flexion or extension and alteration of the carrying angle persist into adult life.[2]

An accurately reduced supracondylar fracture should never give elbow-joint disability. If it has not been reduced no amount of physical therapy will restore full flexion or extension. Proper reduction demands a knowledge of the radiographic appearance of the lower end of the humerus in youth and an appreciation of its cartilaginous nature.

All authorities agree that the great majority of supracondylar fractures can be reduced satisfactorily by manipulation. Watson-Jones states categorically that by manipulation repeated several times if necessary, these fractures can always be reduced without resorting to skeletal traction or operative reduction.[2] Harmer[5] agrees that the majority of cases can be reduced by the closed method. He also believes that many of those cases in which closed reduction

is abandoned on account of circulatory interference are cases in which an attempt is made to force the forearm into acute flexion before the posterior displacement has been corrected. Skeletal traction through the olecranon has been advocated for purposes of reduction.[6, 7] This may cause capsular contraction and permanent stiffness.[2] The use of pins and wires about the epiphyses should be avoided if possible. Premature ossification may result and cause permanent shortening of the arm.[8] Rarely open operation is required to effect reduction[9] but internal fixation is practically never necessary.[5] Occasionally it is impossible to maintain satisfactory reduction. In such instances open reduction and internal fixation is often employed. Better results will be obtained, however, by lateral adhesive traction.[4]

Most writers agree that, after bony union has occurred, elbow movement should be allowed to recover at its own rate. Passive stretching—"forcing the joint"—is absolutely contraindicated.[2, 3, 6, 8, 10, 11, 12]

The prognosis of supracondylar fracture is excellent[2, 13] provided perfect reduction is obtained by manipulation and joint movement is allowed to recover at its own rate.

External Condylar Fracture

External condylar fracture is also a childhood injury and it ranks next in frequency after the supracondylar type. In a large series of lower humeral fractures[3] 50% were supracondylar and 15% were external condylar. The fragment usually includes the external epicondyle, capitellum and adjacent part of the trochlea. The separated fragment is the whole external condyle, to which is attached the external lateral ligament and the common extensor origin of muscles. The fragment may be variously displaced. Rotation of the fractured condyle occasionally occurs so that the fractured surface faces upward or outward and the articular surface downward or medially (Fig. 2). In addition there may be rotation around a vertical axis. This malposition results from the common extensor pull. This fracture is intra-articular. The gravity of this injury is increased because of the radiolucency of a large part of the displaced fragment. The roentgenogram shows only the ossification centres of this large and important growth cartilage. The lesion may thus be overlooked or misinterpreted.[2]

External condylar fracture results in grave joint deformity and disability if the fragment is not accurately reduced. Anatomic reposition is imperative. If closed reduction fails operation is urgently indicated. Unless the displacement is corrected non-union is likely. Cubitus valgus gradually develops. This is due to lack of support of the condyle plus epiphyseal growth disturbance. As the medial condyle develops normally the lower end of the humerus becomes distorted.[1, 14] The carrying angle becomes greatly exaggerated and the stage is set for delayed ulnar palsy. In addition the joint curve relations are disturbed which results in blocking of flexion and extension.[1]

When there is lateral but no rotatory displacement perfect reduction can usually be secured by manipulation.[2] However the fragment is usually considerably displaced and rotated, and often cannot be reduced by the closed method. It has been suggested that if there is marked rotatory displacement manipulative reduction is impossible because of the interposition of soft tissues. Watson-Jones states, however, that he has been able to effect reduction satisfactorily in some instances.[2] In view of this observation closed reduction should be attempted. If it fails operation is indicated. All authorities agree that the fracture must be anatomically reduced and held. Most maintain that in the majority of instances operative reduction is necessary.[1, 3, 5, 6, 10]

Operative reduction should be accomplished with a minimum of dissection so as to prevent complete separation of the condyle from its soft tissue attachments (blood supply). If aseptic necrosis of the fragment supervenes marked limitation of joint motion will result.[2]

It is questionable whether the results of conservative treatment are as satisfactory as reported. Condylar fractures occur in children and are followed to adult life in only very few cases. How many of these fractures terminate in a distorted elbow with partial ankylosis is unknown. Lee[12] studied a group of cases from the time of injury to adulthood. The x-ray study of the end-results was interesting. External condylar fractures that had been treated by open reduction showed a well developed condyle in good position. Those treated by closed manipulation showed an enlarged condyle with mal- or non-union.

MEDIAL EPICONDYLE FRACTURE

The epiphysis of the medial epicondyle fuses with the humeral shaft at about 18. The majority of epicondylar injuries occur before this age so that the lesion is an epiphyseal fracture or separation. It is a common elbow injury of childhood and adolescence. In the majority of instances this injury is a sprain-fracture. The epiphysis is pulled from the humerus by the common flexor origin in valgus elbow strains. This lesion is a common complication of posterior dislocation of the elbow. Displacement of the fragment may vary in degree but always occurs in a downward direction. It is claimed that the degree of displacement is indicative of the degree of valgus strain to the joint.[2, 5] The fragment may be displaced into the radio-humeral joint.

In the great majority of these fractures closed reduction is the proper treatment. It may be difficult to maintain the fragment in position and non-union occurs frequently. This is of no consequence since the elbow function is not impaired.[4, 6] When the epicondyle is in the joint cavity it must be removed by manipulation[15] or open operation. If operation is necessary, the fragment should be reduced in recent cases and excised in old cases.[2] It is the opinion of some[5] that when the epiphysis is widely displaced or ulnar palsy is present operative reduction with anterior transplantation of the nerve is indicated. This often prevents subsequent injury to the nerve and protracted disability.

MEDIAL CONDYLAR FRACTURE

Fracture of the medial condyle is not as frequent as that involving the lateral condyle. In Eliason and McLaughlin's series of lower humeral fractures[3] 12% were of this variety. In Lee's series of humeral condyle fractures in children 6% involved the medial condyle. In another series of fractures of the lower end of humerus the infrequency of this lesion was striking, the incidence being only 3%.[5] This may be due to the fact that the medial condyle is less exposed to direct trauma than the lateral. In addition, children usually fall on the outstretched hand and hence injure the lateral condyle rather than the medial. The usual cause of this injury is a fall on the flexed elbow, the olecranon thus being driven against the trochlea.

In a child indirect violence is sometimes the cause, the condyle being pulled off by the flexor muscles.[10] The typical fracture line is oblique and extends from above the medial epicondyle through the trochlea and enters the joint at any point as far laterally as the capitellum. Displacement may be slight or great, and the fragment may be rotated on an antero-posterior axis. The relationship of the condyle to the humeral shaft and olecranon is destroyed. Because of the lack of support of the medial condyle the forearm swings in toward the body and the carrying angle disappears.

Sometimes these fractures are mismanaged and the condyle remains displaced and ununited with a resulting varus deformity of the elbow-joint. The condylar displacement changes the normal relationship of the arc of motion between the radius and ulna over the lower end of the humerus. The movements of flexion and extension are limited.[1] In this type of fracture injury to the ulnar nerve frequently occurs. The involvement is usually immediate in contradistinction to the long delayed palsy of external condylar fractures. Usually the nerve lesion is merely a contusion and its function returns spontaneously. When open reduction is necessary to secure bony apposition the ulnar nerve should always be examined.

In children it is very important to reduce the condylar fragment to perfect position in order to prevent a progressive deformity. The fragment should never be excised as this will inevitably result in serious growth disturbance. Reduction and retention of the fragment is often difficult by closed methods. If manipulation and traction fail, open reduction and, if necessary, internal fixation is indicated.[5, 6, 14] The carrying angle should be preserved.

INTERCONDYLAR FRACTURE

The above mentioned fractures are usually childhood injuries. The intercondylar T- or Y-fractures are injuries of adult life. In a large series of lower humeral fractures 4% were of this variety;[3] in another series 13% were classified in this group.[5]

This lesion is a supracondylar fracture complicated by the lower fragment being divided more or less vertically into two segments. The fracture line is transverse or oblique through the lower end of the humeral shaft and roughly vertical between the condyles. The vertical plane enters the joint; the transverse plane separates the loose condyles from the shaft. There is often comminution of the distal fragments and occasionally shattering of the joint surface. The fracture may be compounded and is frequently complicated by fractures of the upper ends of the radius and ulna. It is always accompanied by marked soft tissue damage. Nerve lesions are of frequent occurrence.

The injury may be caused by a severe fall on the hand or elbow or by direct violence. The wedge-shaped olecranon process is driven up-

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ward between the condyles and splits them in a vertical direction. The displacement may be slight or great. In the simplest type there is little separation of the condyles and the distal fragments are posterior. This corresponds to the supracondylar fracture of the extension type. The lower fragments may be displaced forward as in the flexion type. One lower fragment may be displaced and the other remain in position. In the severest type the condyles are widely separated with the shaft lying between them.

The management of these injuries is difficult. The fragments are thin so that accurate bony contact is not easy to obtain or maintain. In some instances manipulative reduction is simple but because of the instability of the fragments redisplacement occurs. It may be impossible to secure perfect alignment by manipulation and traction. Operative reduction is unsatisfactory as extensive dissection is necessary and internal fixation always required. It has been the experience of most authorities that either continuous traction or internal fixation is necessary to hold the fragments.[1, 3, 5, 6, 10, 11, 14] The majority of these authorities agree that better results are obtained by closed methods with the use of traction.[1, 2, 4] Anatomical reposition of fragments may be obtained by operation with internal fixation. Nevertheless the final range of elbow movement is less than that recovered after closed reduction with less accurate apposition of the fragments. Operative reduction and fixation is not justified by the end-results. The results obtained by skeletal traction[6] are no better than those obtained by adhesive traction (Conwell).[4] The traction pin may cause some residual elbow stiffness.[2]

Even with the best management the prognosis of intercondylar fracture is not good. There is frequently distortion of the arc of motion at the joint and contracture of the capsule resulting in limitation of movement.

Epiphyseal Separation

Whereas supracondylar fracture is pre-eminently a lesion of childhood, epiphyseal separation is absolutely confined to the period of growth. Displaced epiphyses result in restriction of elbow motion and carrying angle alterations. Premature epiphyseal union with consequent growth disturbance leads to a progressive elbow deformity. Perfect reposition of the displaced epiphysis does not necessarily insure subsequent normal growth.[16] Nevertheless anatomic reduction is imperative to prevent the deformities which result in elbow ankylosis. Fortunately, epiphyseal injury does not often result in growth disturbance, so that if reduction is complete the prognosis is good.

Before the age of 5 the lower humeral epiphysis tends to be separated as a whole. After this age the capitellar epiphysis (external condyle) is more frequently involved. Usually a portion of the shaft is broken off and displaced with the epiphysis (Fig. 2). The lesion is actually an external fracture.

Roentgen interpretation of the elbow in childhood is difficult. During the period prior to epiphyseal ossification it is impossible radiographically to diagnose these lesions. During this period clinical evidence is all-important. "Sprain" should not be accepted on the evidence of negative roentgen findings. On the other hand the appearance of the normal joint may suggest an epiphyseal separation when no such condition exists.[17, 18] The difficulty of radiographic diagnosis is illustrated in Fig. 3. Superficial examination of the films does not indicate any lesion. Actually there is a separation of

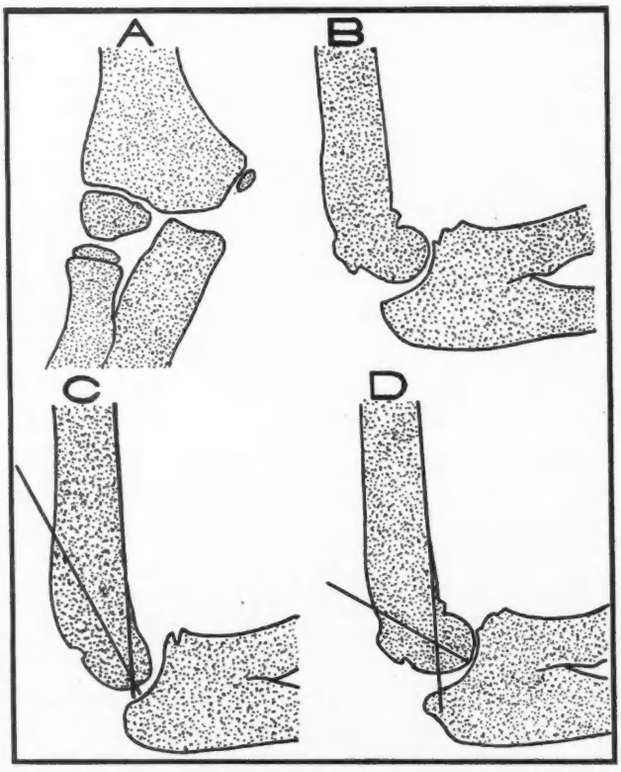

Fig. 3.—(A and B) Antero-posterior and lateral views of an injured elbow. On first inspection there appears to be no bone injury or displacement. (C and D) Comparison with the opposite elbow (C) shows that the lower humeral epiphysis is tilted and displaced forward. (From Watson-Jones, *Fractures and Joint Injuries*, 3rd Ed., vol. 2, 1943.)

the lower humeral epiphysis with forward tilting which will cause a permanent limitation of elbow extension. Films of the opposite elbow should always be taken for comparison.[2]

In the great majority of instances accurate anatomic reposition can be accomplished by manipulation. Occasionally operative replacement is necessary but only rarely is internal fixation required. Operative trauma is undesirable because of the increased possibility of epiphyseal injury and premature ossification.

In a series of 110 cases of epiphyseal separation[16] there were numerous examples of missed diagnoses. Continuing disability necessitated further roentgen examination two or three weeks later. The films all revealed callus at the epiphyseal borders. Elbow injuries during childhood and adolescence, despite negative roentgen findings, should be considered epiphyseal injuries and so treated.

Radial Head and Neck Fracture

Fractures of the upper end of the radius rank next in frequency to supracondylar fractures of the humerus in statistics of fractures at the elbow joint.[19] They frequently result in grave elbow disability. A fairly high proportion of upper radial fractures have associated complicating injuries such as posterior dislocation of the elbow, fractures of the coronoid, olecranon, lower end of humerus, radial and ulnar shaft and radial nerve lesions. The associated lesion may be overlooked or, vice versa, the associated lesion may be treated and the all-important radial head fracture missed. The upper radial epiphysis may be separated during the vulnerable age period but it does not follow that all upper radial injuries in childhood are epiphyseal separations. The majority are fractures similar to those of adult life.

Fracture of the radial head or neck is usually caused by a fall on the outstretched hand. The force transmitted along the radial shaft drives the head against the capitellum. It has been emphasized that the resulting injury is not limited to the radial head. The articular cartilage of the capitellum may be bruised, fibrillated or broken off.[2] There is great variation in the types of the resulting fractures of the upper end of the radius. There may be a simple subperiosteal crack, or part of the head may be depressed, tilted and impacted. The entire head and neck may be markedly comminuted and displaced.

Fracture of the radial head is not the minor injury it may appear to be. Frequently the bone lesion is more severe than the roentgenograms suggest. Fractures of the head and neck with displacement commonly cause prolonged incapacity, marked limitation of elbow and radio-ulnar movement and permanent disability. Because of the nature of the radio-humeral and radio-ulnar articulations, anatomical reposition of fragments is essential in order to regain full movement and to prevent the development of traumatic arthritis. Because of the situation and nature of the fracture in the majority of instances, this is impossible.

Simple fractures of the head or neck without displacement are best treated conservatively. If there is displacement which cannot be fully corrected by manipulation, open reduction is indicated. Excision of the radial head is indicated in all comminuted and displaced head and neck fractures in adults.[1, 5, 6, 8] It has been suggested that in suitable cases a more local excision of fragments is sufficient.[4] A long-term end-result study has shown, however, that the more radical head resection gave better results.[2] All authorities agree that if operation is indicated it must be performed early. Late excision of the fractured radial head will not improve elbow stiffness. On the other hand excision of the radial head in growing children removes the epiphyseal line. Thus this procedure is absolutely contraindicated.[2, 14] Fortunately the commoner childhood injury is the "buckled" greenstick fracture of the neck which can be corrected by manipulation or operative reposition.[1, 4, 10]

Many incomplete fractures of the upper end of the radius are overlooked and are considered as sprains and contusions of the elbow.[8] An accurate diagnosis is essential for proper treatment.

Fracture of the head or neck of the radius is a serious injury, and a completely normal elbow rarely results.[5] However with proper treatment, recovery of a useful elbow is probable. Recovery is slow and gradual and may take a year. Regardless of elapsed time, the recovery must not be "hastened" by ill-advised joint-forcing measures. Movement must be allowed to recover by itself at its own rate. On the whole, the results in this group of injuries are worse than in any other group of elbow injuries.[5]

Olecranon Fracture

Fracture of the olecranon is a common injury of young adult life and comprises about 12% of all fractures at the elbow joint. The plane of fracture may run transversely or obliquely through the olecranon at any point from the tip to one inch distal to the coronoid process. The usual site of fracture is at its junction with the coronoid. The epiphyseal line is small and above this point; epiphyseal separation is uncommon. The fracture line always enters the elbow-joint.

Fracture of the olecranon is not infrequently comminuted, compounded and associated with other injuries. A considerable percentage of olecranon fractures show little or no displacement. On the other hand the fragments may be widely separated. The proximal fragment is pulled and tilted upward by the triceps tendon. The degree of separation depends not upon the bone lesion but upon the extent of the injury to the triceps aponeurosis.

Olecranon fracture may be caused by direct trauma such as a fall or blow on the point of the elbow. It may also be caused by muscular action in the same manner as the patella is fractured. As the hand or forearm strikes the ground the powerful, tensed triceps snaps the olecranon.

Anatomic reposition of the fragments is essential to preserve the power of active extension and to prevent limitation of elbow movement. Treatment depends on the degree of separation. Fractures with little or no displacement should be treated conservatively. Occasionally an olecranon fracture with separation of the fragments can be perfectly reduced and maintained by closed methods. If absolute reposition is not obtained or maintained, operation is indicated. In the great majority of olecranon fractures with displacement, open reduction, internal fixation and repair of the triceps expansion is indicated. It has been found that better results have been obtained with absorbable suture[2] or fascia lata.[20]

Recovery of elbow movement is slow but must be permitted to proceed unhindered by "forcing" the joint. Six to 12 months may elapse before recovery is complete.

Attention has been drawn to fractures of the upper third of the ulnar shaft as a cause of elbow-joint disability.[8, 21] The upper fragment may be flexed and radially displaced. This deviation alters the relationship of the sigmoid cavity to the trochlea. A perfect restoration of alignment must be obtained to restore the articular relations.

Comment

Stiff and deformed elbows continue to be prevalent in otherwise vigorous young men. Despite the teachings of Ashhurst and many others over the past forty years there has not been a general appreciation of the fact that these childhood injuries are serious. Most elbow injuries in childhood are not sprains. They are fractures.

Conclusions

1. In this series of 213 men with a positive history of elbow injury, 97 had disabled and deformed elbow-joints.

2. Better results can be obtained by exact diagnosis followed by proper treatment.

3. Poor results will continue to follow missed diagnosis and improper treatment.

4. Sprain or contusion are common labels for childhood elbow injuries and are partly responsible for incorrect treatment.

5. Limitation of movement of the joint is very common after elbow injuries. It is due to capsular contraction or bone block.

6. After union has occurred elbow movement should be allowed to recover at its own rate. "Forcing" the joint is contraindicated.

7. Subsequent bone growth does not correct angulations and displacements.

8. The majority of elbow fractures can be reduced satisfactorily by closed manipulation.

9. Some elbow fractures require operation from the start.

10. Anatomic reduction of all elbow fractures is imperative.

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INDUSTRIAL NURSING*

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INDUSTRIAL nursing was given official recognition as a service of national importance in the first year of this war, when the Minister of Labour and National Service in Great Britain ordered the appointment of a state registered nurse to every factory working for the Crown. This decision, taken in spite of an acute shortage of graduate nurses, speaks for itself. Special lectures were then provided by the Ministry of Health to make the work of these nurses more effective in keeping workers fit and on the job at a time when the future of the nation depended upon unprecedented output, under virtually impossible conditions.

Although management in this country is also vitally interested in keeping employees at work, and at maximum efficiency, no similar official action has been taken. In a recent study[1] of 10,992 plants, employing 1,058,677 workers, only 2,259 establishments had even part-time medical service, and only 668 plants, representing one-quarter of the workers, employed a nurse.

Industrial nursing is not a new venture, for graduate nurses have been employed in industry on this continent since 1895. In the early years of the movement, the nurse was employed to visit sick workers and their families. Later she undertook emergency work in the factory in case of accident, and many plants first employed a nurse after a fatal accident had occurred.

The philosophy of industry has undergone a change in recent years. The provision of protective medical and nursing services is no longer considered as a philanthropic gesture by far-seeing industrialists, but rather as a sound investment yielding increased output, improved plant morale and lower compensation rates. Such results are secured by the placement of employees in jobs for which they are fitted, keeping minor injuries from becoming serious, and assisting in the prevention of accidents and sickness. A successful health service, therefore, must show a reduction in labour turn-over and lost time.

Reliable studies have shown that fifteen times as many man-days are lost in industry due to general sickness as are caused by industrial accidents and occupational diseases together. It is obvious, therefore, that, in order to keep the employee on the job, the physician and nurse must be concerned with more than first-aid measures.

While there have been changes in the philosophy of industry, there have also been changes in the preparation and outlook of physicians and nurses. There is an increasing emphasis on the preventive aspects of medicine, and the importance of promotion of the health of individuals by means of periodic health examination, and supervision of the worker and his environment. This emphasis is also becoming noticeable in the basic training of all nurses, as well as in the expansion of facilities for the preparation of public health nurses to meet the demands of health services versus sickness services, whether in industry or elsewhere.

It is true that the interested nurse who goes into industry direct from her hospital experience will probably give good emergency service, but only after years of wasteful trial-and-error methods will she realize the full opportunities of the industrial nurse.

Industrial nursing today may be defined as the application of nursing skills and procedures to the care of the injured or sick employee, the intelligent use of community resources to restore such an employee to maximum usefulness, safety education to prevent accidents, and the promotion of the health of industrial workers by instructing them in the fundamental principles of healthful living, adapted to their specific needs, and in terms that they can understand.

The three main objectives of the nurse in industry are: (*a*) emergency care of sick or injured workers, and necessary follow-up care; (*b*) prevention of accidents and occupational diseases; (*c*) promotion of the general well-being of all employees.

To achieve these ends, the duties of the nurse may include any, or all, of the following: first-

* For previous articles see *Canad. M. Ass. J.*, **51**: 439 and 521, 1944.

aid, follow-up care of injured or sick employees, assistance at medical examinations, health teaching, guidance of employees in securing correction of defects, the keeping of adequate records, supervision of first-aid equipment and supplies, supervision of plant housekeeping, co-operation with safety council, good relationships with all departments, co-operation with community health and social agencies for the benefit of employees and their families, and home visiting.

Success as an industrial nurse depends to an unusual degree upon personal qualifications. It is essential that she should be interested in all kinds of employees, understand them and be able to handle people skilfully. She must be healthy, cheerful, alert and emotionally mature. Ability to organize and administer the service is also important. She must have, or develop, that capacity of "fitting into" an organization and working in co-operation with all departments for the welfare of the employee.

The industrial nurse must, of course, be a good nurse, a graduate of an approved school of nursing, and a registered nurse in good standing in the province in which she works. It is most desirable that she should have had a general course in public health nursing, which includes a study of industrial hygiene, industrial nursing, psychology, health teaching and social case work. At the present time there are 1,356 nurses employed in industry in Canada. It would be impracticable to require that every industrial nurse should be a public health nurse, because the number so qualified is insufficient to meet the demand. In the meantime, it has been recommended to the Canadian Manufacturers Association by the Canadian Public Health Association that, where several nurses are employed in an industry, at least one of them should be a qualified public health nurse.

It is obvious that in plants where the nurse works without a physician, such preparation is even more important, in view of the additional responsibility she carries. One of the chief concerns of the nursing profession is that so many nurses in industry have had no special preparation for work of such national importance. Institutes or refresher courses for nurses in industry are provided by most universities which offer postgraduate facilities in nursing. In this connection, a physician can do much to encourage the plant nurse to take advantage of such opportunities when they are available.

The nurse in industry, no matter what her qualifications may be, should always work under medical direction, either directly or through the medium of standing orders. The nurse is employed by management, however, and it is important that the line of authority be clearly defined. In large plants, it is usual to find a medical department with a physician to direct the work. In small plants, medical services may be on a part-time basis, or emergency service only. In some cases, there is no medical service at all.

Where there is a full-time doctor, the nurse works directly with him, but where the medical service is on a part-time, or call, basis, the direction still comes from the physician, though much of it will be in the form of standing orders, to cover situations with which she must deal in his absence. In plants where there is no physician, or emergency service only, it is even more important for the nurse to have standing orders for her guidance. These may be secured from the committee on industrial health in the province. Where such a committee does not exist, the Standing Orders for Nurses in Industry approved by the Council on Industrial Health of the American Medical Association may be used,[2] for the Sub-Committee on Industrial Health of the Associate Committee on Medical Research of the National Research Council has recommended that these Orders may be used, until such time as they are superseded by a comparable Canadian guide.

In any case, the nurse should have signed standing orders to cover the following situations: minor cuts, abrasions, hæmorrhage, simple and compound fractures, burns, eye injuries, toothache, abdominal distress, dysmenorrhœa, unconsciousness, nausea, and headache.

Before initiating a nursing program, the nurse should familiarize herself with the Workmen's Compensation Act, and the labour legislation of the province. She should make a complete tour of the plant, preferably with the physician. During this tour, she will learn what she can about the processes carried on, the industrial hazards, the safety devices, general conditions of the plant including cleanliness, heating, ventilation, lighting, lunch-rooms, locker- and rest-rooms. She should make contacts with the heads of departments, foremen, the safety council, and welfare committee. She should be informed regarding sick leave regulations, and benefit schemes. The proportion of

male and female workers, and the age groups employed, should also be investigated. With this background of information and understanding, she will be better prepared to plan a constructive program.

In her contacts with employees, either in the medical department or in their homes, she will be able to talk more intelligently and be more useful and helpful because of her knowledge of their working environment. Program planning may well begin with the quarters, sometimes called the hospital, the medical room or department, the first-aid room, or better still, the health service. In the preceding article of this series, details as to the location, space required, and necessary equipment were described, so it is not necessary to repeat this information. It is taken for granted that the nurse will share in the planning of the unit where she is to work.

The extent to which the department is of real service will depend upon good relationships. To earn the confidence of employees, the department must be business-like, efficient, spotlessly clean, and attractive, but preferably with as little of the hospital atmosphere as possible. Many industries are discarding the traditional white furnishings, and substituting regular office equipment, or cheery, bright-coloured furniture.

The nurse can do a great deal to set the tone of the department and must be very particular about her grooming, and her uniform. If it is white, it must be immaculate, from cap to shoes. Many factory nurses now wear a coloured washable dress, similar to the public health nurse's uniform, or a white smock, which is practical and can be removed easily and quickly if the nurse visits in the homes.

The nurse is the hostess, and employees must be received courteously, treated efficiently and reassuringly. Waiting time must be reduced to a minimum by careful planning and timing of appointments, for wasted time affects not only the attitude of the worker, but also that of his foreman, and influences total output as well.

It might be well to discuss the program in terms of each of the duties listed.

First-aid.—Emergency treatment of minor or major injuries is often the responsibility of the nurse, particularly in plants where there is not a full-time doctor. In anticipation of such emergencies, supplies are on hand and in readily available containers. Standing orders have been secured and the nurse is thus able to proceed quickly and with assurance to give the necessary assistance at the scene of the accident, or in the medical department. She is responsible for seeing that the physician is summoned, if policy or circumstances indicate such a procedure. If hospitalization is required, the nurse knows in advance the company regulations in this regard, and no valuable time is lost. She also notes the circumstances surrounding the accident, whether safety devices were used, and she is able to complete compensation papers, if necessary. She is interested, of course, in determining whether anything could be done to prevent the occurrence of a similar accident in the future, and co-operation with the safety council will further this end.

A definite arrangement for follow-up treatment of minor injuries, dressings, etc., should be planned and appointments made. Arrangements must also be made so that when the nurse leaves the department the switchboard operator is kept informed of her whereabouts, in case of emergency. If she visits employees in their homes, satisfactory arrangements must be made for first-aid service during her absence.

In many plants, first-aid for minor injuries is undertaken by first aid men in each shop or department. If this is the case, the physician or nurse, or both, must see to it that definite regulations are laid down as to what may, and what may not be treated by a first-aider, and how it is to be done; that the recommended supplies and equipment are provided for them; that they are certified and competent men and know how to use such supplies. In such circumstances, it is usually a safe rule to say that every treatment should be reported to the medical department. This is usually done by means of a simple record sheet which is sent to the nurse at noon and at night. It is also wise to insist that no second dressing is to be applied, which means that any employee requiring re-dressing goes to the medical department, which is a definite safeguard.

The supervision of first-aid boxes and supplies for use in the plant or "on the road", as provided by some companies, and the replenishing of such supplies, is usually the responsibility of the nurse. Time should be allowed in the program for regular attention to this important duty. The boxes should be inspected at regular intervals and supplies which deteriorate replaced when necessary.

The use of the nurse's time to cut, fold and prepare dressings is certainly not recommended today when so many more profitable duties require her time and attention. It is much cheaper in the long run to purchase such articles from a regular surgical supply house.

Assistance at examinations. — This includes pre-employment and other medical examinations. The pre-employment examination is particularly important as the basis for future health work. It is possible for the nurse to establish good relationships with the prospective employee, to explain to him how the service can help him, and assist him, if necessary, in arranging for the correction of any defects which may be found. A knowledge of local resources is invaluable for this purpose.

In describing the pre-employment examination in the preceding article, the author outlines a procedure which presumes that there is more than one nurse in the department. For the nurse working alone, the matter resolves itself into working out a reasonable routine with the physician and, so far as possible, in limiting appointments to the number which can be handled satisfactorily. In these days of rapid turnover, this is much easier to say than to do, however, and she will have to be guided by conditions. Much can be done beforehand, which will make the examinations proceed without the sense of being too much rushed.

Health teaching.—The nurse uses every possible opportunity to teach healthful living, but, for the nurse who has not had special preparation, it is necessary to caution her that the changing of lifelong habits cannot be effected quickly. She must realize too that the provision of adequate facilities for employees to wash their hands before lunch is more effective than telling them that they should wash, when facilities are totally inadequate. Pamphlets, posters, pay-envelope inserts, and articles in the "house organ", are useful to *supplement* individual teaching, but they cannot replace the instruction given by the physician and nurse in their day-by-day contacts with the workers. The experienced nurse also finds opportunities for short health talks to groups of employees on topics of general interest.

Records.—The first prerequisite for the keeping of good records is a good record system. Each company develops its own system, but there are certain basic records which every industrial nurse must keep. These include: (*a*) a container, either a folder or envelope; (*b*) individual record (this may be a combination type or separate record cards for examinations, sickness and accident); (*c*) referral to and from department; (*d*) return to work pass; (*e*) referral to hospital, etc.; (*f*) daily report; monthly report; annual report.

The main purpose in keeping records is to provide working tools for better service and for recording the volume and type of work done. If the information is used for these purposes, the time spent in recording is time well spent. If it is not used, why keep records at all! The time factor can be reduced by the provision of part-time or full-time clerical assistance.

A whole book could be written on records and recording, but those interested will find much valuable information on the subject in "Public Health Nursing in Industry".[3]

Supervision of plant housekeeping.—The average adult spends one-third of his life at his place of work. The work environment is, therefore, an important factor in his life and exerts a strong influence on his health. Apart from the specific hazards of the industry and their control, there are many health problems in the environment which require merely a little ingenuity and a small outlay of funds for their correction. Proper cleaning, ventilation and clean, well-equipped wash rooms can do much to relieve fatigue and strain. In this respect the tactful nurse can make a real contribution.

Visiting nursing.—This aspect of industrial nursing has passed through many phases. Large corporations employing several nurses may provide for visiting of sick employees in their homes. It is very important that there should be no flavour of the truant officer in such work. It is a satisfaction, however, to many workers to know that the company is interested in his progress and the visit reassures him. It also gives the nurse an opportunity to ascertain whether or not the patient is receiving adequate medical care, and if this is not the case, it is often possible to make arrangements for the needed service from his family doctor, or removal to hospital.

It appears, however, that this service by the nurse outside the plant is becoming less common, partly owing to her increasing responsibilities in the department, and also because of improved social and health services in many communities.

Nursing service for the small plant. — It is estimated that 60% of the industries in Canada

employ under 500 workers, and many of these plants purchase emergency medical service only, or employ a first-aid man. In the United States, the estimate is "that nearly two-thirds of the industrial workers are without any provision of the services which a well trained public health nurse can render".[4]

To meet the needs of these small plants, it is now possible to buy part-time nursing service from the Victorian Order of Nurses in many centres in Canada, somewhat after the plan pioneered in the United States by Henry Street visiting nurses. Very satisfactory results have been achieved when clearly defined agreements are drawn up and each party to the contract knows what to expect. This service is paid for on an hourly basis, and it is estimated that at least two hours of nursing time is needed per week for each hundred employees. The nurse comes to the plant at a time when she is needed, either to assist the doctor with examinations, teaching, etc., or to do dressings which have been prescribed. Her hours can be increased as her usefulness is realized.

This system has many advantages for the small plant. Firstly, the nurses are public health nurses and are supervised by their organization, so that standards are maintained, and, secondly, if the nurse is off duty, another qualified nurse relieves her.

CONCLUSION

An attempt has been made to outline some of the services which are urgently needed in industry, and which can be rendered by the graduate nurse. The future of industrial nursing rests mainly in the hands of the nurses themselves. "They have it in their power to create a service which will be sought for by industry because of the foundations of practical common sense, understanding and good judgment on which their work is based".[5]

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EXPERIMENTAL CORONARY THROMBOSIS*

(Effect of Chronic Excitement of the Vagus Nerves by Daily Infusion of Posterior Pituitary Extract)

By G. H. Ettinger and Margaret E. MacK. Sawyer

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HALL, Ettinger and Banting[6] investigated a possible relation of coronary thrombosis to chronic vagal excitement by infusing acetylcholine, the chemical mediator of parasympathetic activity into unanæsthetized dogs daily, until they died. This event occurred in one to eight months after the initial infusion, with signs of cardiac failure. Dogs of middle age or older developed myocardial degeneration and hyaline changes in the *tunica media* of the coronary arteries. Coronary thrombosis occurred in two of the animals. The younger dogs suffered no arterial damage, and little or no myocardial change.

Horswell[7] repeated these experiments, using larger doses of acetylcholine. His animals developed no degenerative changes in the heart or coronary arteries.

Ettinger, Hall and Banting[5] failed to produce myocardial and coronary arterial damage by repeated and sustained electrical excitement of the vagus nerve in the dog under nembutal or dial, over periods up to 200 days. Manning, Hall and Banting[8] stimulated the vagus nerve in the dog under light nembutal anæsthesia and without anæsthesia, continuously for periods up to 120 hours. They describe the production of myocardial damage, without changes in the coronary arteries. This would represent an acute, rather than a chronic change.

The experiments described below were designed to determine the effect on the heart and its arteries of repeated daily excitement of the vagus nerve in the unanæsthetized dog, over a period of years. The method chosen for vagal excitement was by intravenous infusion of a dilute solution of posterior pituitary extract in normal saline. Resnik and Geiling[12] showed that this substance produces vagal inhibition of the

* A study aided by a grant from the William Spankie Fund, Queen's University, and the National Research Council, Ottawa.

heart of the dog. Sawyer and Ettinger[13] demonstrated that a slow continuous infusion of a dilute solution of posterior pituitary extract produces a vagal bradycardia in the dog without direct myocardial depression, and with little change in blood-pressure. The heart-rate may be maintained at approximately one-half the normal resting rate, for as long as two hours, and the process repeated daily for as long as four and one-half years, with little evidence of a tolerance.

EXPERIMENTAL

Experiments were done on fourteen male dogs, weighing from 31 to 65 pounds. All were mature; ten were of middle age or older. They represented the equivalent of a human age group which might be susceptible to degenerative arterial change. In five of these dogs, several weeks prior to the period of infusion, the sympathetic nerve supply to the heart was interrupted by aseptically removing the stellate ganglia and the thoracic sympathetic chains down to the ninth rib, after the method of Cannon *et al.*[2] This provided a means of vagal excitement without opposition through sympathetic cardiac reflexes, and without an influence of sympathetic inhibitors, which, as Sawyer and Ettinger[13] have shown, are sensitive to posterior pituitary extract.

Before undergoing infusion, all animals had a period of training, during which they were taught to rest quietly on a table. Their resting heart-rates were determined, and normal electrocardiograms recorded. Their weights and condition of nutrition were noted. In some animals the arterial blood-pressure was determined directly by connecting a mercury manometer to a sterile needle inserted in the femoral artery. Electrocardiograms and weights were recorded every two weeks throughout the period of the experiment.

Posterior pituitary extract was dissolved in sterile normal saline in a sterile flask equipped with an outlet on the bottom. A rubber tube attached to the outlet led, through an air trap by which the infusion rate might be measured, to a metal adapter which might be inserted into a syringe needle.

The posterior pituitary extract used was mainly that prepared by the Connaught Laboratories, Toronto. It contained 8 to 10 pressor units per c.c., and tricresol, 0.1%, as a preservative. For a short time a solution of pitressin, prepared by Parke Davis & Co., containing 10 pressor units per c.c., and 0.5% chloretone was used. A solution for infusion was made of 1 c.c. of either extract dissolved in 500 c.c. of sterile saline.

Infusions were carried out as follows. The dog was made to lie quietly on his side on a table until his resting heart-rate was determined. His rectal temperature was recorded. Alcohol was applied to a leg, and a sterile hypodermic needle was inserted into a leg vein and taped in place. The needle was connected to the infusion bottle by the adapter on the rubber tube. Infusion was maintained by gravity flow for 90 or (usually) 120 minutes, at such a rate as to reduce the heart-rate to approximately one-half the resting level, without disturbing the gastrointestinal tract. This inhibition was steady throughout the period of infusion and was accompanied by a pallor of the mucous membrane. Every 5 to 10 minutes the heart-rate was counted, as a check on the inhibitory effect. The dogs were soothed by the treatment, and rested so quietly that it was possible to have fourteen dogs undergoing injection simultaneously, with only one attendant watching them. During the two hours of infusion a dog received a minimum of 300 c.c. of the solution, representing at least six pressor units.

Infusions were done seven days a week, on all dogs, with very rare interruptions.* The total number of consecutive daily infusions for each dog was as follows:

Normal dogs: D-1, 1,670; D-4, 1,492; D-5, 1,492; D-3, 1,307; D-7, 1,036; D-8, 926; D-6, 909; D-9, 906; D-2, 122.

Dogs with cardiac sympathectomy: D-10, 786; D-13, 757; D-14, 730; D-16, 492; D-11, 93.

Inhibition was constant throughout any infusion and over the total period of the experiment the animals showed no tolerance to posterior pituitary extract, as indicated in Table I.

RESULTS

One animal, D-1, an old male, died of an accident after 122 consecutive infusions. Another, D-11, with sympathetic cardiac denervation, was found dead on the morning after his 93rd infu-

* These included, in four dogs, late in the experiment, a period of seven weeks in which the effects of withdrawal of posterior pituitary extract were observed on the daily output of urine. This will be reported separately.

TABLE I.

THE EFFECT OF INFUSION OF POSTERIOR PITUITARY EXTRACT ON THE HEART RATE OF THE DOG, NORMAL, AND WITH CARDIAC SYMPATHECTOMY, REPEATED DAILY OVER A PERIOD OF YEARS

Dog	*Condition*	*Resting rate per minute*	*Minimal infusion rate per minute*	*Resting rate per minute*	*Minimal infusion rate per minute*
		1938		*1942*	
Sandy..	Normal....	64	30	60	44
Toy....	Normal....	66	40	80	44
Scarface	Normal....	68	30	76	36
Rufus...	Normal....	72	40	88	44
		1940		*1942*	
General.	Cardiac sympathectomy.....	64	36	72	44
Sargent.	Cardiac sympathectomy.....	68	44	68	40
Ted....	Cardiac sympathectomy.....	72	40	76	44

sion. Neither showed any evidence of cardiac damage.

All other animals survived, had gained weight, and were in good health at the conclusion of the experiment. None of the dogs developed cardiac murmurs. No electrocardiographic evidence of coronary or myocardial damage was detected in any dog during the experiment.

The surviving dogs were killed in the following manner. Under local anæsthesia, an arterial cannula was inserted into the femoral artery, and connected to a mercury manometer. A kymographic record of blood-pressure was taken. This was compared with earlier blood-pressure records and with the known blood-pressure in the normal dog, in order to determine whether the repeated infusion had produced a hypertension. Then the animal was infused with posterior pituitary solution in order to determine the rise in blood-pressure which occurred along with the cardiac slowing. Finally, the animal was given dial or nembutal and killed by exsanguination. A thorough autopsy was carried out at once.

The mean blood-pressure in 9 of these dogs were found at this time to range from 120 to 140 mm. of mercury. The blood-pressures of 5 of the dogs, recorded before or shortly after the daily infusions had been started, and of 6 other normal untreated dogs, ranged from 120 to 140 mm. In one of the experimental dogs whose blood-pressure two years before had been 130 mm., the blood-pressure on the day of death was 170 mm., but he was tense and much excited. It may be concluded that the repeated infusion of posterior pituitary extract had not produced a chronic hypertension in these dogs.

Infusion of posterior pituitary extract caused a rise in blood-pressure of only 10 to 30 mm. of mercury, except in one animal in which the pressure fell 5 mm. The blood-pressure fell slowly during continued infusion, although the cardiac inhibition was maintained.

Autopsy.—A careful autopsy was done on the two dogs which died during the course of the experiment, as well as those which were killed by exsanguination. There were no gross changes in the heart or its blood-vessels in any of the dogs.

Blocks of each heart were removed for histological section as follows: (*a*) through the anterior coronary artery at various levels, and its left descending branch; (*b*) right and left papillary muscles; (*c*) from the interventricular septum; (*d*) through posterior coronary artery; (*e*) through small blood-vessels at the base of the right and left ventricles.

Sections were stained by hæmatoxylin and eosin, and by Kull's stain as modified by Millar[9] to show hyaline degeneration. No degenerative changes were detected in the coronary arteries or in the myocardium in any section of any heart.

The gastro-intestinal tract was examined carefully. The only pathological changes seen were in the stomachs of two of the dogs. In one of these, D-8, (926 infusions) there were thirteen shallow ulcers; in another, D-16 (cardiac sympathectomy, 492 infusions) there was one shallow ulcer.

DISCUSSION

In an investigation of this kind, it is essential to choose as an experimental animal one in which, like man, degenerative changes in the arteries may be expected after middle life. The dog is a suitable animal since it has been shown that spontaneous thickenings of the *tunica intima* of arteries with deposits of lipid may occur in this species, increasing with age (Anitschow[1]).

The failure of these experiments to induce degenerative changes in the myocardium and coronary arteries throws doubt on the hypothesis

that such damage is related to overexcitement of the vagus nerves.

The vagus fibres supply the coronary arteries from the main stems to the small branches (Woollard[14]). If coronary arterial damage were attributable to the chemical action of excessive amounts of acetylcholine, this would have to be produced within the arterial wall in response to over-stimulation of the vagal fibres running to the arteries. "Vagus-stuff" produced elsewhere in the heart would be destroyed before it could reach the coronary arteries.

The evidence that posterior pituitary infusion results in vagal excitement is based on its effect on the heart-rate. There has been no conclusive evidence offered that posterior pituitary extract excites the arterial branches of the vagus. It is altogether likely, however, that conditions which excite the vagus mechanism in the heart excite all fibres, and that the arteries respond at the same time as the heart is slowed.

The shallow peptic ulcers produced resemble those described by Dodds, Noble *et al.*[3, 4] and by Nedzel,[10, 11] in response to posterior pituitary extract injections. They used much larger doses, for shorter periods of time.

Summary and Conclusion

Excitement of the cardiac vagus fibres induced in fourteen dogs for two hours daily, by intravenous infusion of posterior pituitary extract for periods varying from 3 months to 4½ years, failed to produce myocardial degeneration, coronary arterial thrombosis, or chronic hypertension.

It is concluded that coronary thrombosis is not produced by chronic vagal excitement.

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THE PERTUSSIS SKIN TEST IN THE NEWBORN AND LATER INFANCY*

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EVANS[1] discussing the antigenic properties of *H. pertussis* in relation to active immunization states, "In view of the potency of pertussis toxin and its lethal and necrotic properties, one would suppose that it might be a factor in establishing infection by damaging tissue in advance of invasion, and that antitoxic immunity would therefore have a prophylactic value. This supposition is supported by the recent work of Strean *et al.*,[2 to 6] who are of the opinion, based on clinical results, that pertussis toxin can be used to test susceptibility of children to whooping-cough in the same way as Schick toxin is used in diphtheria."

In view of these publications of Evans and Strean an attempt was made to determine whether a relationship existed between the incidence of pertussis in Montreal and the skin test (Strean), using pertussis endotoxin; also whether the relationship simulated that of the Schick test to the incidence of diphtheria.

A group of 680 children ranging in age from one week to eight months, taken from several clinics in Montreal, were skin tested. The results were as follows:

* From the Pædiatric Division, Medical Department, Royal Victoria Hospital, the Child Welfare Association, and the Royal Victoria Maternity Hospital, Montreal.

TABLE I.

RESULTS OF SKIN TESTS IN CHILDREN WITH PERTUSSIS TOXIN

Age	*Number*	*Positive*	*Negative*	*% Positive*
New born.....	300	62	238	21
2 – 3 months...	128	52	76	41
4 – 5 " ...	126	66	60	52
6 – 8 " ...	126	82	44	65

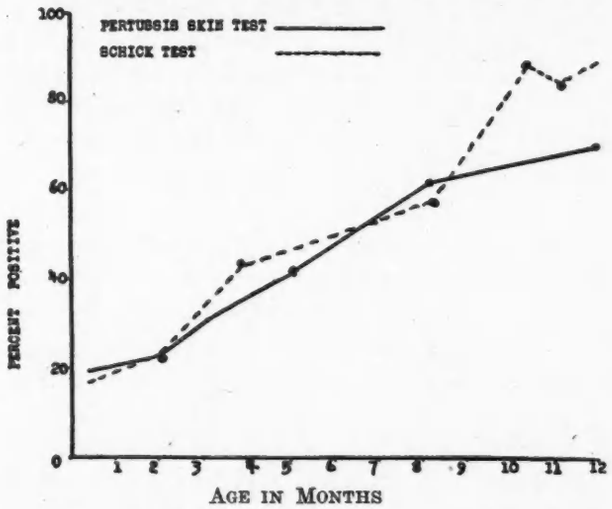
TABLE II.

INCIDENCE OF PERTUSSIS IN MONTREAL IN 1937

Age in months..	0 – 1	1	2	3	4	5	6
Cases.....	2	17	34	47	44	55	74

CHART 1

THE RELATIONSHIP OF PERTUSSIS SKIN TEST AND PERTUSSIS TO THE SCHICK TEST AND DIPHTHERIA



From these tables and chart it appears that there is a steady increase in the positive reaction to the pertussis skin test until the child reaches the eighth month of age, which may suggest a loss of passive immunity and increasing susceptibility to the disease. It is also of interest that the curve plotted for pertussis almost coincides with that for diphtheria in Montreal using the Schick test as a means of determining susceptibility to the latter disease. Figures for 1937 were chosen because in that year the incidence of pertussis in Montreal was high.

In another group of 60 children picked at random in several outdoor clinics, 45 were positive to the pertussis skin test, while 15 remained negative. The case histories of these children showed that in almost all instances those positive to the test had not had pertussis while those negative were recently recovered cases. All of these children were over one year of age.

It is a known fact that the newborn, negative to the Schick test, carry in their blood diphtheria antitoxin by passive transfer from the mother through the placental circulation. In order to prove that the newborn, negative to the pertussis skin test (Strean) carried pertussis antiendotoxin in their blood, samples of blood were drawn from a group of five infants, two with positive and three with negative skin tests. The serum was separated from the clotted blood and titrated against pertussis endotoxin by intradermal inoculation in rabbits. It was observed that in those three infants negative to the skin test, 0.1 c.c. of their serum neutralized from 2 to 8 skin test doses of toxin, while in those two positive to the test, 0.1 c.c. of their serum failed to neutralize even one skin test. As controls, the toxin was mixed with saline and injected into the same rabbit receiving the serum-toxin mixture. In all instances necrosis developed where the control material was injected.

On the basis of this experimental evidence it would appear that pertussis antiendotoxin passes from mother to child through the placental circulation.

MATERIAL

The skin test toxin was used as directed.* The toxin as received was in the form of a dried powder and was reconstituted with an appropriate volume of sterile distilled water. The tests were carried out by injecting 0.1 c.c. of the diluted toxin intracutaneously into the flexor surface of the forearm. Readings were made 24 hours later. Reactions showing a definite erythema of 5 mm. in diameter were classed as +, those of about 10 mm. ++, while those over 15 mm. +++.

DISCUSSION

From the results of this study it would appear that pertussis skin test toxin may give an indication of the immunological state of a child with respect to pertussis. Recently recovered cases were almost invariably negative to the test, while those infants over six months of age and without a history of pertussis, were for the most part positive.

In the newborn only 21% of those tested were positive. Experimental evidence seems to indicate that those reacting negatively carry anti-

* The material for skin testing was kindly supplied through the courtesy of Dr. J. Murray Scott of Ayerst, McKenna and Harrison, Montreal.

toxin in their blood most likely by passive transfer through the placental circulation. Since the serum from infants reacting negatively neutralized pertussis toxin, as evidenced by intradermal titration in rabbits, some justification seems to exist for this conclusion. Moreover the incidence of pertussis in Montreal for infants up to the age of six months parallels the figures for positive reactors in this age group and lends further credence to this belief. Interesting enough is the fact that the percentage of children positive to the pertussis skin test closely approximates that of the Schick test for diphtheria in the first year of life.

SUMMARY

The pertussis skin test described by Strean may offer a reliable method of determining the state of immunity a child possesses against pertussis and may bear the same relationship to pertussis as the Schick test does to diphtheria.

The newborn negative to the test apparently possess immunity to pertussis because of the passive transfer of antibodies through the placental circulation.

I wish to thank Dr. John R. Fraser and Dr. N. W. Philpott of the Royal Victoria Maternity Hospital, Dr. Graham Ross and the Child Welfare Association of Montreal for their co-operation; without which this study could not have been undertaken.

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A new medical order is inevitable. Whether we shall cling to the old or create a new is not the question. The swift course of events has decreed that there can be no turning back. The question is rather what sort of a medical order it is going to be and whether it is the best which wisdom and knowledge can contrive. Like every promising venture, it has its hazards. Is it to be shaped by the best understanding which law, medicine, the social studies can bring to it? Or is it to be constructed by amateurs in ignorance and with good intentions?—W. Berge, Justice and the future of medicine, *J. Urol.*, **52**: 382, 1944.

THE IMPORTANCE OF PROTEIN INTAKE IN CANCER

By H. C. Connell, B.A., M.D., C.M.

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THE effect of underfeeding on tumours was mentioned in the days of Galen. Unfortunately, most of the dietary suggestions until more recent times have not been based on controlled experimentation, but rather on dietary faddism. Williams in his treatise on *The Natural History of Cancer*, 1908, and Hoffman[1] in his classical review, *Cancer and Diet*, 1937, make pointed reference to the relative scarcity of cancer in vegetarian communities. Williams says, ". . . there cannot be the slightest doubt—in face of the overwhelming evidence I have adduced in the course of this work—that the incidence of cancer is largely conditioned by nutrition".

Dietary experiments in relation to cancer have failed to give protein intake the careful consideration it deserves. The literature contains many reports on the retarding effect of underfeeding on the growth of transplanted tumours in mice. Morischi[2] in 1909 was probably among the first to study the subject systematically. Later, in 1914-15, Rous[3] used mice with spontaneous tumours and studied the effect of diet on recurrences after operation in which he left a small piece of tumour. He underfed his experimental animals on a diet thought to be sufficient for maintenance but not for growth. He found a delay for a relatively long period in the development of recurrences and a retardation in growth of tumour grafts as compared with his controls on a normal diet. Sigura and Benedict[4] also found that prolonged, insufficient feeding postoperatively had a distinct retarding influence upon the frequency of recurrence of spontaneous tumours in mice. Bischoff[5, 6] and his associates showed that caloric restriction results in the retardation of the growth of mouse sarcoma 180. They found that by restricting the caloric intake 33%, doubtfully significant effects were produced upon tumour growth, but by a 50% restriction, marked retarding effects were produced, while the body weight losses were barely less than those on a 33% restriction. Tannenbaum[7] in 1940 reported a comprehensive study of the relationship of body weight to cancer incidence in man. He reviewed insurance statistics and showed by this means that

persons of average weight or less are not so likely to develop cancer as those who are overweight.

The retarding effect on tumour growth and also the inhibition of tumour takes reported by these and other authors have been based on a restricted caloric intake. Rusch and Kline[8] tested the possibility of the influence of forced exercise on the rate of tumour growth. They reasoned that neoplastic cells are not so likely to develop or to become established if little or no excess energy remains after the body requirements have been met. If this were so, forced exercise which would use up excess energy should show inhibition in rate of tumour growth under controlled experimental conditions. They found the exercised mice gained less weight and the rate of tumour growth was also less than that observed in the control animals, but again no emphasis was placed on individual dietary constituents which obviously influence energy supply. It is possible that a considerable part of the 20% casein as well as the other protein constituents of their diet was expended in energy supply, leaving but a small fraction of the original protein intake available for synthesis.

In the experiments mentioned above, restriction of overall caloric value has automatically reduced the protein intake. This restriction may have had a marked influence in the observations recorded by Rous, Sigura, Benedict, Bischoff and others.

Underfeeding, which obviously implies restricted protein intake, appears to greatly reduce the incidence of leukæmia in high leukæmia stock mice. Furth[9] in an attempt to determine whether malignant cells are present in the spleen and lymph nodes of underfed animals that failed to develop leukæmia at a time when normally fed mice of this stock die of the disease, injected suspensions of cells from these organs into the leukæmia-susceptible strain and found that these injections produced leukæmia in the injected mice. This finding strongly suggests that underfeeding retards the multiplication of malignant cells.

Lewisohn[10] working with a tumour growth-inhibiting factor recovered from yeast, reported a definite acceleration of the healing process and an increase in the number of complete regressions when the diet of his experimental animals was altered from dog chow pellets to polished rice. These results might be explained on the basis of altered protein intake. Hoffman suggests that a study of protein metabolism and its relation to the diet of cancer patients may prove to be of practical value.

Schomin[11] found the rate of protein synthesis by Jensen's sarcoma tissue to be twice that of normal liver tissue. Amino acid intake in relationship to protein synthesis is of paramount importance in normal metabolism and it is reasonable to suspect that a still more intimate relationship may exist in the cancer patient, especially in view of Schomin's work, and the fact that tumour mass is essentially protein in character. As the disease advances and the malignant process increases in intensity, the demand for those amino acids which enter into the protein composition of the malignant cells must reach considerable proportions. It is reasonable to suspect that this demand for amino-acids is much more important than mere caloric intake. Should this ever-increasing demand for essential building material be denied by deliberate restriction of protein intake to a supply sufficient for maintenance but not for growth, what will be the effect on the malignant process?

Metabolic requirements for protein are both quantitative and qualitative. It is therefore necessary to consider both factors in the selection of the protein source in diets designed to demonstrate the effect of protein intake on the progress of the malignant process *in vivo*. The amino acids, histidine,* arginine,† methionine, tryptophane, valine, threonine, lysine, leucine, isoleucine and phenylalanine are at present regarded as essential food factors. The complete withdrawal of any one of these ten acids, with the exception of the first two, will promptly result in establishing a negative nitrogen balance. Replacement will restore a positive balance. The body is apparently capable of synthesizing all other known amino acids, but at least eight of the ten amino acids mentioned must be supplied in the food or death will result.

In 1914, Osborne and Mendel reported that normal rats fed a diet deficient in the essential amino acid lysine, failed to grow. The addition of lysine to the deficient diet was followed by rapid growth. This work was confirmed by McGinty, Lewis and Marvel in 1925. Courrier

* Histidine—recently considered by Rose *et al.*[12] to be non-essential for man.

† Arginine—body can supply enough for maintenance but not enough for growth.[13]

and Coste[14] reported a definite retardation of Jensen's sarcoma in rats on a diet in which gliadin, a protein known to be deficient in lysine, formed the chief source of protein supply. Voegtlin and Thompson[15] conducted experiments with mice bearing spontaneous neoplasms on a lysine-free diet and showed that lysine was an essential factor for the growth of mammary carcinoma. Thus, lysine is essential for both normal and malignant growth. One might reasonably expect this to be true of all the essential acids, but further work should be done to clarify this point.

More recently, Kocher[16] showed that a lysine-deficient diet produced a temporarily retarding effect on tumour growth in mice, but that if such a diet is begun, when the tumours have reached an advanced stage of development, the inhibiting effect is either not apparent or of short duration.

These authors do not consider total protein intake beyond control of the specific amino acid tested. It is obvious that dietary protein should be considered quantitatively as well as qualitatively and also that there is an intrinsic as well as an extrinsic source of nitrogen supply. The availability of the intrinsic supply from both normal and pathological catabolism as well as from possible storage proteins should be taken into account when estimating the extrinsic supply to be fed in such experiments. This is not easy to do with mice, but might be controlled in man by the frequent estimation of nitrogen output.

EXPERIMENTAL

As a means of determining the possible importance of protein intake in the management of malignant disease, feeding experiments in mice bearing Belough sarcoma transplants are here reported. Casein[17] has been found to be capable of supplying all necessary dietary requirements with respect to its amino acid constituents. It will support growth if fed at a level of 12 to 18% of the total diet. It will maintain a positive nitrogen balance when given at a 10% level, but this amount is not sufficient to support growth. For these reasons and the fact that its amino acid composition is known and fairly constant, soluble casein (B.D.H. acetic precipitated) has been selected for use in these experiments as the source of nitrogen supply.

EXPERIMENT 1

This experiment was designed to show the effect of restricted protein diet of adequate caloric value on maintenance and growth of *normal mice* as shown by average daily weights over a period of twenty-five days.

Twenty healthy mice of approximately the same age were selected from our stock of "A, stock strain", originally acquired from the Roscoe P. Jackson Memorial Laboratories, Bar Harbour, Maine. These animals were placed in individual cages and separated into two groups of ten animals each. Each group contained an equal number of male and female mice.

Group I.—The control diet: this consisted of the usual laboratory standard Purina dog chow cubes (caloric value 3.5 calories per gram). An excess of food was maintained in the cages throughout the twenty-five day period. Water was given freely. The animals consumed an average of 4.6 gm. equivalent to 16.1 calories.

Group II.—A selected restricted protein diet was prepared and an excess was maintained in the cages throughout the twenty-five day period. Water was given freely. The diet consisted of cornstarch, 53%; sugar, 2%; lard, 35%; casein (soluble), 10%, vitamins, contents of 1 capsule "Tutamate" (Frosst) and 1 capsule "Abdol" (Parke Davis) per 100 gm. of diet, agar, 80 ml.'s of (3% solution in 0.25% NaCl) per 100

TABLE I.

AVERAGE DAILY WEIGHTS IN GM.

Days	*Group I*	*Group II*
1	23.2	19.5
2	23.9	20.5
3	23.7	20.5
4	24.0	21.2
5	24.5	21.1
6	24.1	20.4
7	23.9	20.2
8	23.8	20.1
9	23.7	20.1
10	24.2	19.8
11	25.1	20.4
12		
13	25.3	19.2
14	25.1	19.7
15	24.9	19.9
16	24.9	19.8
17	24.9	19.5
18		
19	25.5	19.0
20	25.6	19.2
21	25.4	18.4
22		
23	26.1	19.6
24		
25	26.9	19.8

gm. of diet. When this diet was mixed and allowed to solidify, it was easily cut into cubes.

The proportion of carbohydrate, fat and protein closely approximates the amounts considered to be necessary for a well-balanced diet, with the exception that the protein content is at or near the minimum level reported to maintain a positive nitrogen balance.

The caloric value is equal to 5.75 calories per gram of dry diet. The animals consume an average of 3.2 grams of diet per day which is equal to an average caloric intake of 18.4 calories.

The results of feeding this selected restricted protein diet on the maintenance and growth of normal mice are shown in Table I.

It would appear that this diet, as prescribed, might be satisfactory as a maintenance diet to be used in experiments with tumour bearing animals to determine the effect of restricted protein intake on tumour growth.

EXPERIMENT 2

This experiment was designed to determine the effect of restricted protein diet of adequate caloric value on the growth of Belough sarcoma in mice.

Forty healthy mice of approximately the same age and sex as those used in Experiment 1 were inoculated with Belough sarcoma cell suspension in tyrode solution; 0.1 c.c. of inoculum being injected into the right thigh muscle of each animal. All animals were placed in individual cages and kept on the standard diet (dog chow cubes) up to the tenth day following the injection. At this time, well established tumours were visible and palpable. The animals were divided into two groups of twenty animals each. They were weighed, the tumour size recorded, and care taken so that both the control group (I) and the selected diet group (II) were as equally balanced both in weight and tumour size as possible.

Estimation of tumour expansion representing rate of tumour growth was recorded from time to time throughout the experiment by a ring templet method.

The circumference of these rings was calculated in millimeters and tumour advance recorded periodically. The data for daily weights and tumour growth are shown in Table II. The number of spontaneous disappearance of tumours is also noted.

TABLE II.

	Average daily weights in gm.		*Average tumour circumferences in mm. (rate of tumour growth)*	
Day	*Control diet*	*Experimental diet*	*Control diet*	*Experimental diet*
0.....	24.5	25.4	38.2	38.9
1.....	24.7	25.9		
2.....	24.3	24.4	46.8	42.0
3.....	25.2	24.6		
4.....	25.3	24.4	49.6	42.0
5.....	25.0	24.4		
6.....				
7.....	24.8	24.1	55.7	42.4
8.....	25.4	24.3		
9.....	26.0	24.2	53.8	44.0
10.....	25.1	24.1		
11.....	26.0	23.9	61.5	46.0
12.....	25.5	24.0		
13.....				
14.....	25.9	24.2	65.6	47.7
Spontaneous disappearance...			1	5

The advance in tumour circumference in the respective groups is shown graphically in Fig. 1.

OBSERVATIONS

It can readily be seen from the slope of the curves in Fig. 1 that the rate of tumour growth in the control animals is more than double that in the experimental group. There is a slight increase in the average daily weights of the control animals, in spite of the fact that their

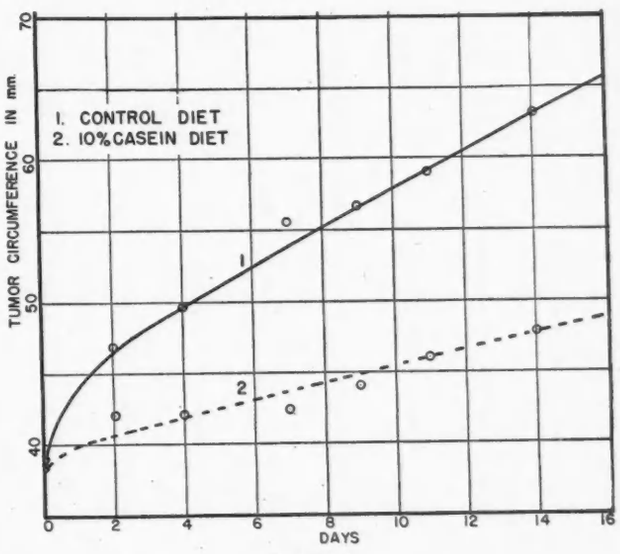

Fig. 1

tumours are growing rapidly. The average weight in the experimental group shows a slight decline. The general appearance of the animals in the control group on the day upon which the experiment was terminated was poor. Many of these animals were moribund; one had actually died. On the other hand, all the animals on the restricted protein diet appeared active, and none

were moribund. The experiment was terminated on the fifteenth day because the first animal to succumb to tumour advance died on that date, and because the blood was required for study of the protective colloids of the serum of the individuals in the two groups. It has been shown by Munro[18] that the protective colloid index in human cancer serum is significantly lower than in normals.

The number of spontaneous recoveries in the respective groups, five to one, is worthy of consideration. The experiment suggests the possibility that the slowing up of tumour advance offers a better opportunity for the re-establishment of control of cell organization, and also the destruction of tumour cells by the reticular elements normally concerned in spontaneous recovery.

Discussion

It appears from the experimental evidence related in this communication that the question of protein intake in malignant disease is of very real importance.

Underfeeding, or caloric restriction by feeding less of the identical diet as reported by other authors automatically reduced protein intake. No importance seems to have been attached to this particular dietary component by them. Lewisohn's[10] results might be explained on the basis of altered protein intake. If by dietary means it is possible to reduce the rate of multiplication of the cells of the malignant process, then such dietary measures might be of very considerable assistance in the management of cancer patients in practice. Any treatment whether it be surgical, radiological or biochemical is likely to be more efficient if applied at a stage of reduced speed of multiplication of tumour cells.

Other experiments designed to determine the effect of protein restriction on spontaneous recovery and life extension in animals, are now in progress. Experiments of this nature in the clinical field are also being conducted and will be reported at a later date.

Summary

By the deliberate restriction and selection of the protein content in a diet of adequate caloric value, a profound retardation of the advance of Belough sarcoma in mice has been observed. This inhibition of the rate of tumour growth is not accompanied by serious loss in weight in the animals or the appearance of other untoward symptoms.

The retardation of tumour growth on diets of low caloric intake reported by earlier investigators, can be explained at least in part on the basis of restriction of the protein constituent.

The incidence of spontaneous disappearance of tumours was greatly increased.

The author wishes to acknowledge his debt to Professor L. A. Munro for his constant assistance and many helpful suggestions during the course of this work, and to Miss Bernice Berry for her technical assistance. The work was made possible by a grant from the Province of Ontario through the Department of Health.

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SULFONAMIDE SENSITIVITY AND C-AVITAMINOSIS

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WITH the increasing use of sulfonamides in chemotherapy we find in the literature more frequent reference to their toxic reactions. These may range in severity from slight nausea and vomiting with a mild erythematous rash to the more serious manifestations, conjunctivitis, stomatitis, hæmolytic and hæmorrhagic states, hepatitis, myocarditis and nephritis, the latter being manifested by oliguria, hæmaturia, albuminuria and anuria, and frequently proving fatal.

It has been found that some subjects can tolerate massive and prolonged medication with these drugs, while others have shown severe

toxic symptoms following small doses. In other cases sensitivity is apparently developed by cumulative action under repeated intermittent medication. It would thus seem obvious that some preconditioning constitutional state must determine sensitivity to these drugs. As stated by Osgood:[1] "Research to determine the variations in nutrition and metabolism actually responsible for the so-called idiosyncrasy is urgently needed".

Green *et al.*,[2] report that toxic side effects of sulfathiazole were found to be much more frequent in patients whose primary illness was toxic and febrile, irrespective of the total dosage or length of time of administration, the ratio being 5 to 1 as compared with a non-toxic and non-febrile group of cases similarly treated. A significant clue to a possible nutritional etiological factor determining potential sensitivity lies in the fact that the symptoms of toxic reaction are closely similar to those of C-avitaminosis (frank or subclinical scurvy). Schropp[3] reports a case of sulfapyridine sensitivity in a boy aged 5 years under hospitalization for pneumonia. Eight hours after the first dose of the drug he developed soreness of the eyes and mouth. The gums became red, swollen and hæmorrhagic, associated with a vesicular stomatitis. The temperature rose to 106°. Schropp regarded these symptoms as suggestively similar to C-avitaminosis, so decided to try the effect of concurrent administration of ascorbic acid, 50 mgm. with each subsequent dose of sulfapyridine. "The results were astounding". Within 18 hours the temperature dropped to normal, and the soreness of the mouth and gums had completely disappeared.

Personally, I have had a similar experience in the vitamin-C therapy of sulfonamide poisoning.

The patient, a middle-aged female, developed an erythematous dermatitis which rapidly assumed a vesicular and exfoliative type, involving the entire body surface and orificial mucous membranes. She had previously used a sulfa ointment in the treatment of an open sore on the hand. The history of this slow-healing sore, together with the dietary history, indicated a likely deficiency of vitamin C, so a colour test by titration with dichlorphenol-indophenol was made on the urine, showing a pronounced C-avitaminosis. Ascorbic acid, 500 mgm., was administered daily for a week, accompanied by copious dietary intake of citrus fruit juices. Intensive vitamin-B-complex therapy was also given parenterally and orally for the relief of concomitant symptoms. The patient made a rapid and uneventful recovery.

The results obtained in this case and in the Schropp case referred to previously would seem to indicate the possibility of vitamin-C deficiency being the conditioning factor predetermining potential sensitivity to the sulfonamides. In fact, it is suggestively apparent that the so-called "sensitivity", "allergy" or "idiosyncrasy" to these drugs may be in reality a manifestation of acute C-avitaminosis, precipitated, perhaps, by the increased bodily demand for the vitamin associated with the primary infection or the toxic effects of the chemotherapy. It would accordingly seem advisable that all chemotherapy cases be given a preliminary urinary test of vitamin-C status, and in all cases showing C-avitaminosis concurrent adequate ascorbic acid administration as a possible prophylactic to sensitivity.

For rapid determination of vitamin-C status I employ a modification of Tillman's method—titration with dichlorphenol-indophenol—whereby the initial test dose of 300 mgm. of vitamin C is omitted. One tablet of the titration reagent (Hoffmann-LaRoche), corresponding to 1 mgm. of vitamin C, is dissolved in 1 oz. of water. To a small amount of this indigo-blue solution in a test tube is added an equal quantity of recently-voided urine, the degree of decolorization indicating the vitamin-C status, with rapid and complete decolorization being optimal.

Vitamin C has been referred to as the "anti-infection" or "anti-toxic" vitamin. The tissue concentration of this vitamin is known to be rapidly depleted in febrile and toxic states. Chamelin and Funk[4] have shown that the injection of whole liver, a substance rich in ascorbic acid, reduces the toxicity of sulfanilamide in rats. Pelner[5] points out that the toxic effect of other substances, notably neoarsphenamine, salicylates and diethylstilbœstrol, can be reduced by ascorbic acid. Holmes *et al.*,[6] have shown that intensive vitamin-C therapy is more effective in lead poisoning than is the usual therapy with calcium. They point out that painters having normally a high intake of vitamin C do not develop lead poisoning. The vitamin acts as a detoxifying agent, leaving less vitamin C available for physiological purposes. These authors further emphasize the similarity of the tooth and gingival changes in lead poisoning and scurvy. The recent observation by Holmes,[7] that many forms of food allergy are relieved by saturation of the system for seven days with a daily dose of 500 mgm. of ascorbic acid, also has a suggestive significance in relation to sulfonamide sensitivity.

In my own experience I have found that concurrent administration of large doses of vitamin C in sulfonamide therapy not only prevents toxic reactions but apparently enhances its bacteriostatic efficacy. As an illustration, a patient, confined to bed with a paralytic affection, developed on four occasions within the past year acute infectious complications. In the first instance, July, 1943, the patient developed an acute pneumonia—temperature 105°, pulse 150, respirations 60. Consultation confirmed the diagnosis, the patient being regarded as moribund. Three doses of soluseptazine, 15 grains each, were administered hypodermically, four hours apart, the last dose being followed by hypodermic injection of 500 mgm. of ascorbic acid, which was repeated in 24 hours. Within 48 hours from onset the temperature had dropped to 98°, and convalescence set in. On three subsequent occasions (February, March, and May, 1944) this same patient had acute attacks of cystitis, with temperature 104 to 105°, proportionate pulse and respiration, and pain in the lower abdomen in each instance. In the first of these attacks three sulfathiazole tablets, 7½ grains each, were given four hours apart, and concurrently 1 gram of ascorbic acid hypodermically. Within 24 hours from onset the temperature, pulse and respiration dropped to normal and the abdominal pain disappeared. In the second and third of these attacks the treatment and results were the same, with the exception that sulfadiazine was substituted. No toxic symptoms were noted in any of these attacks, most favourable results were obtained with unusually small doses of the sulfonamides, and their repeated intermittent administration did not develop sensitivity.

At an inquest recently held in Toronto on the death of a 34-year-old male, following self administration of sulfathiazole, the pathologist who performed the necropsy reported as the only evidence of physical injury a discoloured bruise on the arm, "evidently caused by a hypodermic needle". This in itself was, I believe, suggestive evidence of pronounced C-avitaminosis, the associated capillary fragility resulting in hæmorrhagic extravasation. I have frequently noted this tendency to hæmorrhagic discoloration of the tissues following hypodermic injections in subjects with low vitamin-C status, and have found that such discoloration does not occur when the ascorbic acid level is normal. This tendency to capillary fragility and permeability may be utilized in a simple physical test for C-avitaminosis by applying a tourniquet to the upper arm for a few moments and noting the development of petechiæ distal to same.

SUMMARY

A correlated study of the symptoms of sulfonamide poisoning and C-avitaminosis suggests the possibility of the toxic reactions in chemotherapy being merely the manifestation of accentuated latent vitamin-C deficiency, the depletion of the vitamin being effected by the increased bodily demand for same associated with the primary febrile process and the toxic effect of the drug, while the vitamin acts as an anti-infection and detoxifying agent.

This hypothesis suggests the precautionary application of a simple chemical or physical test for C-avitaminosis as a preliminary to chemotherapy, and the appropriate correction of any such deficiency by concurrent administration of ascorbic acid, as means of detecting potential reactors and preventing sensitivity to the chemotherapeutic agent.

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Here then is challenge. The arts of medicine have advanced; the importance of medicine has been enhanced; it has become a necessity to the people and an essential in the operation of the industrial system. It has outgrown the organization into which in days of petty trade it was cast. The demand is for a vaster, more comprehensive, more reliable medical service. If an instrument of the common health can be provided on terms the people can afford, the people will rejoice. If you do not help them to it, the people will seize upon whatever agencies are at hand as a help in need. For the universal demand that the common health be served can not much longer be stayed.—W. Berge, Justice and the future of medicine, *J. Urol.*, **52**: 381, 1944.

Case Reports

A CASE OF INTRA-PERITONEAL RUPTURE OF THE BLADDER

By Major James M. Campbell and Lieut.-Col. F. W. Schroeder, R.C.A.M.C.

The case which forms the basis of this report, brought out several interesting findings with respect to hæmoglobin concentration following peritoneal irritation, and in addition it illustrates a rare type of intra-peritoneal rupture of the bladder, where the findings on physical examination were most misleading.

CASE REPORT

Pte. J.B., aged 20, was thrown from his motorcycle and hit a lorry. The exact details of the impact are not known. He was said to be momentarily unconscious.

The description given of him on admission to hospital three hours and a half after the accident was as follows: patient was restless, stating that he was most comfortable when lying down on his left side. Deep breathing "caught him" across the upper abdomen. He had the following external injuries: superficial abrasion, left cheek; bruise in the left temporal region; superficial laceration, ¾" long, under chin; minor abrasions to both knees and to the left leg.

Pain was marked in the right renal area but there was also pain throughout the upper abdomen of a lesser degree. There was some tenderness and moderate guarding, most marked in the right upper abdomen. No suprapubic tenderness was elicited and rectal examination was normal. X-rays of lumbo-dorsal spine were negative.

August 10, 1943: 1800 hours—tenderness and guarding still present in upper right quadrant of abdomen and to a lesser extent in the left side. A stomach tube was passed and fluid withdrawn which relieved epigastric distension of acute onset.

August 11: at 0630 hours he complained of a "full bladder" and was catheterized; 1,600 c.c. of urine tinged with blood were withdrawn. Following this two syringes full of boracic solution were introduced by the catheter and they returned with a clear flow in the exact amounts in which they were introduced.

Urinalysis. — Albumen (2 plus); sugar negative. Microscopical field covered with red blood cells.

At about noon he was catheterized again and 1,300 c.c. of clear urine was withdrawn, without any interruption of the flow from the catheter. The symptoms and signs at this time were thought to be explained by a severe upper abdominal contusion with involvement of the right kidney, and possible retro-peritoneal hæmatoma, causing his gastric distension and inability to void.

The absence of supra-pubic tenderness and the negative rectal findings, together with the large amounts on catheterization, and the results obtained by the withdrawal of amounts of fluid corresponding exactly to the number of c.c. introduced into the bladder, were thought to exclude bladder rupture and the patient was observed as a case of upper abdominal contusion with right renal rupture. He was ordered to be catheterized every eight hours.

August 12: Patient continues to improve; urine is now clear on catheterization. Urinalysis: Albumen (4 plus). White and red cells numerous.

August 13: This morning the patient was considerably better. His temperature was normal and his pulse 84. Still some tenderness and guarding in upper abdomen, present now on the left side more than on the right. His tongue was moist and it was his best day. 1800 hours: Patient suddenly went into shock when using a bed pan. He looked quite ill and stated that he felt weak. He was perspiring and his pulse was 110 with normal temperature. Blood pressure 95/40. No change in abdominal signs except for some distension in upper abdomen. Stomach tube was introduced and large amounts of fluid withdrawn with relief. White cells 24,100; red cells 6,900,000; Hgb. 160%. 1900 hours: Hgb. 120%; red cells 5,600,000. Urinalysis: Albumen (2 plus); red blood cells, few; leucocytes 10 to 12 per high power field.

August 14: Patient has improved. No changes in abdominal signs.

August 15: Patient was restless throughout the night and looks quite ill today. This morning the abdomen presents generalized tenderness and rigidity. Plasma was given intravenously and the patient prepared for laparotomy. The preoperative diagnosis was simply peritonitis with query (*a*) intra-peritoneal rupture of right kidney with urine peritonitis; (*b*) rupture of liver with bile peritonitis. White blood cells 12,900; red blood cells 5,840,000; Hgb. 142%.

Operation, August 15: Cyclopropane anæsthesia. Upper mid-line incision. Peritoneum opened and clear odourless urine poured from the peritoneal cavity. The coils of bowel were only slightly dilated and the peritoneum was of a dull red colour. The renal areas were searched for possible rupture; neither side revealed any abnormalities.

The upper abdominal wound was closed and a small supra-pubic wound was made. The peritoneum was opened below and a large gaping irregular rent was found on the posterior surface of the bladder just above the trigone. The bladder rupture was closed from within the peritoneal cavity. The peritoneum was then closed with a stab tube drain.

The bladder was then exposed extra-peritoneally and opened. A large size Malecot catheter was introduced and tied in position in the usual manner. The supra-pubic wound was closed about the Malecot tube and a small pre-vesical drain.

The urine taken from the abdominal cavity showed no pus cells: a few Gram-positive cocci on direct smear. *Staphylococcus aureus* grown on culture.

August 17: Hgb. 88%; white cells 10,800; red cells 4,140,000.

The postoperative course was uneventful. The supra-pubic tube was removed on the fourteenth day and the patient was allowed up and about on his twenty-first day. Cystoscopy done on October 6 showed a normal bladder wall with the wound in the bladder perfectly healed. The urine was normal. He was returned to duty.

COMMENT

The case note is presented because of the rarity of this type of intra-peritoneal rupture of the bladder. The prominence of upper abdominal signs is a most uncommon, and most misleading finding. The large rent in the peritoneal surface above the trigone, which communicated widely with the pelvic peritoneal space, allowed the urine to collect in the pelvic cavity, and it was catheterized regularly in large amounts as if the bladder were emptied on each occasion. The width and position of the rupture also caused a complete return of fluid introduced. This manœuvre is shown to be of no value in this variety of bladder rupture.

The case reminds us that sterile urine can in some occasions invade the peritoneal cavity and in the unusual instance give rise to no marked signs or symptoms which would call for an immediate laparotomy. On the morning of the third day after the injury he felt fairly well and talked of getting up, his temperature was normal, and pulse was 84. This is contrary to the rule in the great majority of cases.

The high readings of the hæmoglobin estimation are notable features of interest. Serum was dialyzed into the peritoneal cavity and passed out with the catheterized urine. Readings of 160 and 142% of hæmoglobin are a most unusual finding in intra-peritoneal lesions without severe shock; and the physiology of its causation in this case is very instructive.

SUMMARY

1. A case of intra-peritoneal rupture of the bladder with misleading signs has been described.

2. High concentration of hæmoglobin caused by free urine in the peritoneal cavity, was a feature.

BILATERAL CORTICAL NECROSIS OF THE KIDNEYS*

By Harold G. Pritzker, M.D. and Ralph Rose

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The entity, bilateral or symmetrical cortical necrosis of the kidneys is not a newly discovered one. The first cases were described by Friedländer in 1883 (quoted by Volhard 1931) and by Juhel-Rénoy in 1886. Nevertheless the reported number of cases to date is few. In 1941 Duff and Moore[1] reviewed 71 proved cases, 45 of which were reported in the interval 1934 to 1940. Hence there is a definite recent interest in this lesion of the kidneys. The following case is offered as a fairly typical illustration of this condition occurring in pregnancy.

Mrs. H.M. was 28, a mother of three living children. Unfortunately, nothing was known of the prenatal history of the present pregnancy. On March 13, 1943, she was delivered of a stillborn child at home without any physician present. The next day the patient had slight fever and sulfathiazole was prescribed for her. In the course of the following two days she received 180 grains of sulfathiazole. When seen by her physician on the fourth post-partem day the patient was acutely ill. She had slight œdema of the face, hiccoughs, and was vomiting. Her temperature was 100.2° F. It was then discovered that no urine had been passed since delivery. The patient was sent into hospital where she was found to have a non-protein nitrogen of 105 mgm. %; 10,300 white blood cells per c.mm. and hæmoglobin of 37% (Sahli). The blood showed 8.3 mgm. % of free sulfathiazole. Her blood pressure varied from 120/90 to 140/100. Urography by means of injected dye showed no excretion. Retrograde pyelography was essentially negative. Despite all measures adopted in an attempt to overcome the anuria, the patient lapsed into coma and died 7 days post-partem. During the period in hospital, an occasional few c.c. of bloody urine were voided. Incidentally, as far as her husband was aware, the only illness which the patient had had was the occasional attack of bronchial asthma.

An autopsy was performed two hours after death. There was some œdema of the face; emphysema of the lungs; and slight chronic bronchitis. There were slight effusions in the pericardial, pleural and peritoneal sacs. There was some subinvolution of the uterus with a small amount of retained placenta. There were no lesions in the liver indicative of eclampsia. The most pertinent findings were in the kidneys.

Each kidney weighed 185 gm. They were in their usual locations and were of average size and shape. The capsules were thin and could be stripped off readily leaving a finely granular, bright pink surface which was spotted by numerous small hæmorrhages. The cut surfaces presented a striking picture (Fig. 1). Just beneath the capsule there was a narrow zone of bright red tissue. Deep to this there was a broad layer of cortex which bulged slightly, and was dull yellowish-grey and putty-like in appearance. A few scattered areas of hæmorrhage were present in it. Deep to this zone there was another narrow band of bright red tissue. The medulla was bright pink, and was moist except for an occasional area of necrotic tissue in it. These areas were also surrounded by a narrow zone of hæmorrhagic tissue. The renal pyramids were easily seen and the pelves were empty and clear.

Microscopically, the tissues immediately adjacent to the capsule, while showing signs of degeneration, were not completely necrotic. The blood vessels were intensely engorged with red blood cells, as were the glomeruli. A few round cells were scattered in this region. Deep to this there was a broad zone of necrosis. Here only the ghostly outlines of tubules, glomeruli, and blood vessels were seen, forming a uniform eosin-staining mosaic with no trace of cell nuclei evident. As the medulla was approached again there were better staining kidney structures and an intense hyperæmia of the fine blood vessels and glomeruli, with a slight round-cell infiltration of the tissues. In the medulla proper the tissues stained well, although many of the tubules contained laked blood. The picture then was one of rapid and widespread ischæmic necrosis involving the bulk of the outer portion of the cortex. A careful examination of the blood vessels showed that many of the finer ones, *i.e.*, the intralobular arteries, afferent arterioles, and occasional glomerular capillaries had marked necrosis of their walls, dilatation of their lumina and were engorged with red blood cells.

DISCUSSION

Owing to the necrosis it was impossible in most instances to determine accurately whether thrombosis or merely conglutination of red blood cells had occurred in these blood vessels. Furthermore, in most instances fibrin formation and platelet deposition were not seen. It was certain however, that these vessels were plugged by intravascular masses of some sort. The larger

* Read by the senior author at the meeting of the Ontario Association of Pathologists, Toronto, November 15, 1943.

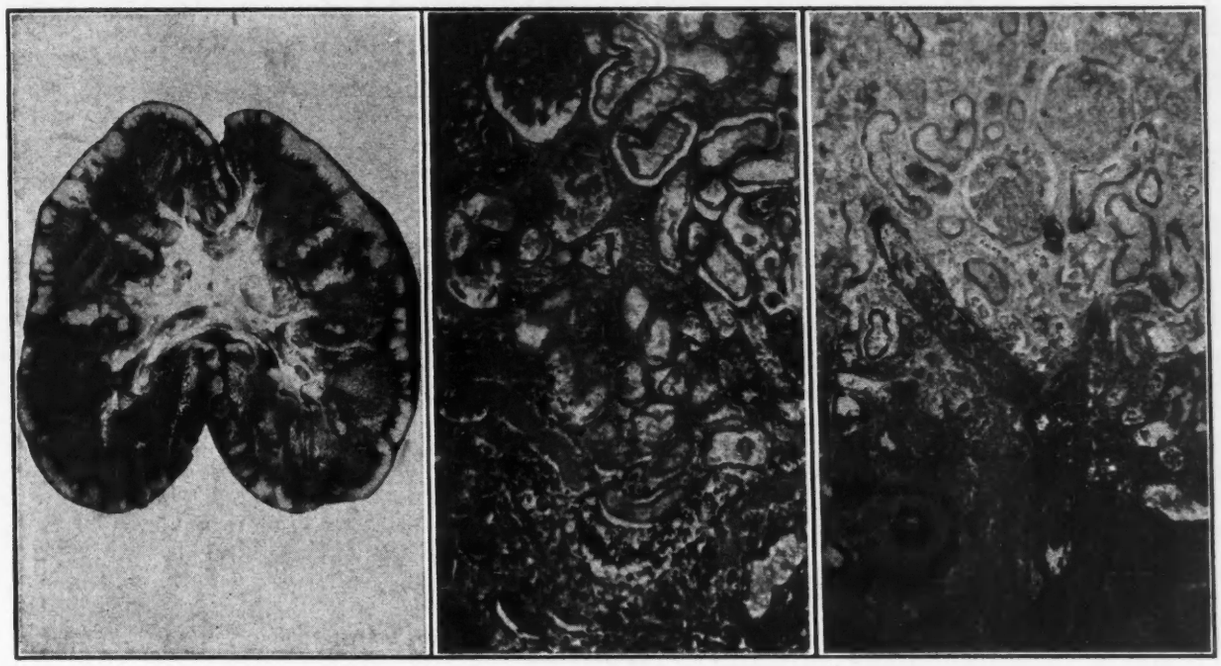

Fig. 1 Fig. 2 Fig. 3

Fig. 1.—Cut surface of one kidney. Note the marked necrosis of the cortex, which is sharply delineated from the medulla by a narrow zone of hyperæmia. **Fig. 2.**—Shows the "ghostly" outlines of glomeruli and tubules, and paucity of cell nuclei in the necrotic cortex. Compare with the viable kidney elements in the lower part of the photograph. **Fig. 3.**—A dilated branching intralobular artery with necrosis of its wall, and conglutination or thrombosis of blood within the lumen. Note the poorly staining cortical tissues present.

arteries in the kidneys did not show these changes.

Of the 71 cases reviewed by Duff and Moore, 48 were associated with pregnancy and 23 were not. In the cases of pregnancy the condition usually occurred in those around 30. Premature delivery and stillbirths were the rule. In many there was premature separation of the placenta, and in a few there were signs of pre-eclampsia. In the majority of the cases anuria developed on the day of delivery or shortly thereafter. In the cases not associated with pregnancy bilateral cortical necrosis of the kidneys occurred in a wide variety of conditions, such as scarlet fever, diphtheria, and other infectious diseases; peritonitis; shock; and following the injection of drugs and biologicals. In three individuals it was a primary condition. In all instances the clinical course was that to be expected when complete cessation of kidney function had occurred. Obviously, there must be less severe grades of this lesion in individuals with eventual recovery. Clinically, this naturally would be difficult to prove.

Experimentally, symmetrical cortical necrosis of kidneys has been produced by the intravenous injection of staphylococcus toxin, powdered lithium-carbonate and large doses of pitressin. The lesion has been seen in the kidneys of swine infected with the virus of hog cholera. Thrombosis or stasis or necrosis of the finer renal vessels occurred in all these cases to produce the ischæmic necrosis.

It is felt by most observers that the necrosis in this lesion is an ischæmic one; and, further, that the specific site of the lesion, namely, in the outer portion of the kidney cortex, suggests occlusion of the intralobular arteries and glomerular arterioles. There is marked disagreement however, as to the nature of this occlusion. Inherent increased coagulability of the blood has been stressed by some, but, then, it seems odd that thrombosis in these individuals should occur in only a particular site in a particular organ. Other authors suggest that the "toxin" causes necrosis of the walls of these vessels with resultant conglutination of blood or thrombosis. Extreme vascular spasm of these vessels as well as extreme vasoparalysis with dilatation have also been postulated. Dunn and Montgomery[2] state that the lesion is akin to acute glomerulonephritis, but more marked, and call it acute necrotizing glomerulonephritis. The fact that so many theories are offered, signifies that the exact etiology is still obscure.

While in all but three cases, and also experimentally, there are good grounds for believing that some responsible "toxin" is produced, as Duff and Moore aptly state, the majority of pregnancies, cases of severe infection, shock etc. do not develop bilateral cortical necrosis of kidneys. Experimentally, it has been shown that the intralobular arteries and glomerular arterioles are especially sensitive to stimulation. It is just possible that there may be individuals in whom these blood vessels are either very sensitive to stimulation normally, or become sensitive during pregnancy or serious constitutional disease. It is interesting to note that in this case the individual may have been of an hypersensitive type, as suggested by the history of "bronchial asthma".

SUMMARY

Another case of bilateral cortical necrosis of kidneys is offered which well illustrates the marked ischæmic necrosis of the cortex of each kidney with occlusion of intralobular arteries and glomerular arterioles. As the crux of this lesion lies in the changes of the cortical blood vessels, the following excellent general theory offered by Duff and Moore for these changes is cited, as an apt conclusion to this paper. "The actual effects produced in renal cortical arteries could vary with the degree of hypersensitivity of these vessels, and with the intensity or duration of action upon them of the irritating deleterious factor. Thus one could conceive of a series of vascular disturbances of increasing severity; intense vasospasm; vasoparalysis; partial or complete necrosis of the arterial walls which might be due either to vascular spasm of extreme intensity or to the direct action of some toxic substance. At any stage in this ascending scale, blood flow might be halted, either by the occurrence of true thrombosis, or through blood stasis and conglutination of red blood cells in dilated blood vessels following vasoparalysis, or even by intense vasoconstriction alone."

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Each of these references possesses an extensive bibliography.

Special Article

GOUT*

By Henry P. Wright, M.D., F.R.C.P.(C)

Montreal

Gout is a fascinating disease which has baffled the medical profession for centuries. No malady has enrolled a more royal patronage or so distinguished a clientele, which includes, through the ages, many of the outstanding members of our own profession. *The cause is unknown and the disease is much more common than is usually suspected, approximately 5% of all cases of arthritis being attributed to gout, often, it is true, unrecognized.* That there is a disturbance of uric acid metabolism has been known for many years, and it was Alfred Garrod who first discovered a test for its detection. Gout is an hereditary constitutional disease, pre-eminently occurring in males and at any age, but more common in those over thirty years. It is characterized clinically by bouts of acute arthritis, which may become chronic and in which there are frequently terminal vascular lesions in the kidneys. Hyperuricæmia and diminished excretion of uric acid may be present long before there is any manifestation of arthritis.

The majority of gouty patients are of more than average weight, and it is true that many do ingest large quantities of food rich in purines and also partake excessively of alcoholic beverages, but to say that this is the underlying cause of gout is no nearer the truth than to assert that carbohydrates are the cause of diabetes.

All mammals, with the exception of man, are able to destroy uric acid; he alone seems to be unable to oxidize it, for even on a purine-free diet, he excretes daily a certain amount. Gout is therefore apparently not due to loss of power of an individual to destroy uric acid. Loss of power to eliminate uric acid is favoured by the finding that in hyperuricæmia there is usually a decrease in the amount excreted in the urine. This suggests that the formation of urate deposits in the tissues might have something to do with disease in the kidneys. Unfortunately, this is not borne out by known facts as deposits frequently occur when all available kidney functional tests are negative. Suffice, therefore, for the present, to say that the reason for the formation of urate deposits in the tissues remains unknown.

Signs and symptoms.—Any form of arthritis which is not clinically obvious, which is worse at night, and, in between attacks, recovers completely—should be suspect of gout. The majority do not notice prodromes to an acute

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attack; in others, premonitory symptoms are present, such as twinges of pain in the small joints, restlessness, irritability, dyspepsia, etc. Often the first articular symptoms are noticed in the early morning and are of exquisite intensity. Later, the joint may become red or dusky-pink, swollen and very tender to the touch. Moderate fever may or may not be present. In the greater number of cases, the metatarsophalangeal joint of the great toe is affected, but other peripheral joints are frequently involved. The joints of the spine, hips and shoulders are rarely included. If the attack is not adequately treated, it may last several days or weeks, but if proper therapeutic measures are employed, it usually subsides rapidly, a point which is not frequently appreciated by the general practitioner.

Attacks of gout are often induced by too strenuous exercise. Surgical operations, dietary and alcoholic indiscretions, and the excessive use of liver extracts and various vitamin B preparations have also been incriminated.

Tophi containing monosodium urate crystals are found only in gout. To certify that a tophus is really present some of its contents should be removed and examined under the microscope.

Laboratory findings.—Hyperuricæmia in conjunction with arthritis is an almost constant feature of the disease. Serum uric acid values are more reliable than determinations in whole blood. More than 4 mgm. % in whole blood and 7 mgm. % in serum are suggestive.

Roentgenological findings.—The roentgenological findings occur late, but are most suggestive, and when well-defined punched-out areas are observed, 5 mm. or more in diameter, in juxta-articular bones, especially of the fingers and toes, they are almost pathognomonic of this disease.

Sedimentation rate.—The sedimentation rate of the erythrocytes is usually increased during an acute exacerbation.

Therapeutic test.—Colchicine in adequate doses usually quickly and in a spectacular manner relieves the arthritic manifestations of gout, whereas other forms of arthritis are not affected by this drug.

Prognosis.—The prognosis for life is good but some cases become chronic and then invariably, in time, the circulatory organs and the kidneys become involved with the usual inevitable result.

TREATMENT OF AN ACUTE ATTACK

When possible, the patient should be put to bed, fluids forced and purines reduced. The following diet is useful during the acute stage:—

Breakfast.—Fruit, or fruit juice; 1 roll, or slice of white bread; 1 glass of milk.

Lunch.—Cereal (not whole wheat), 3 to 4 ounces; milk, 1 glass; eggs, 2; stewed fruit (7 ounces); toast, 1 slice; butter, 1 tablespoonful.

Supper.—Cereal (2 ounces); milk (2 glassfuls); honey (1 ounce); fruit, raw or stewed (9 ounces); 1 roll, or slice of white bread; butter, 1 tablespoonful.

Force an alkaline water between meals.

A fluid intake of from 3,000 to 4,000 c.c. should be encouraged.

Colchicine.—Therapeutic failures will be avoided if this drug is always administered as crystalline colchicine. To obtain relief, full doses must be employed. (The premininary use of a saline cathartic is sometimes advantageous.) There should be an initial dose of two tablets (each 1/120 grain) followed by 1/120 grain every one or two hours until relief from pain is obtained, or until diarrhœa or nausea and vomiting result. The drug is then discontinued. Provided the patient is kept in bed, pain and swelling usually subside within from twenty-four to seventy-two hours after the first loose stools. Frequently the diarrhœa has to be treated by paregoric or some preparation of bismuth. A simple and satisfactory method is to give one teaspoonful of paregoric after each loose stool until the condition improves. The total amount of colchicine usually required varies from ten to fifteen tablets, each of 1/120 grain. To avoid trouble and shorten attacks, the patient should always carry colchicine and begin treatment early in the attack. Colchicine is not a dangerous drug although in adequate dosage it causes unpleasant symptoms.

The local application, every two or three hours, of moist heat in the form of water or glycerin, helps to relieve pain. Diathermy is not helpful. Occasionally patients obtain more relief from an ice-bag or cold packs. Acetylsalicylic acid or sodium salicylate should be prescribed to relieve pain and reduce hyperuricæmia.

If the above combination fails, cinchophen, grains VII should be used alone four times a day for three days a week. This drug is not without danger and, as is well known, fatal cases of necrosis of the liver have been associated with its administration. However, the danger has probably been exaggerated and, when necessary, the drug should be tried under careful clinical observation.

INTERVAL TREATMENT

With our present knowledge, for an individual of gouty diathesis, who has to make his living, interval treatment is not very important. A judicious well-balanced diet, including vitamins, with exclusion of high-purine foods, is advisable, with the exception, at all times, of the following foods: Sweetbreads, sardines, anchovies, calf and beef liver, beef kidneys, brains, meat extracts, gravies, meat soups, turkey, pork, goose, sausage, trout and codfish. Freedom from worry, plenty of fresh air with avoidance of temperature extremes, moderate exercise and adequate sleep are all important. If

alcohol is taken, it should be restricted daily to not more than one ounce of whisky in water.

The above is a very brief summary of our knowledge of gout, and those interested are advised to consult the references at the end of this article for further information. The real purpose of including gout in the series is to emphasize its more common occurrence than is usually suspected, and to re-stimulate in the profession an interest in a disease which is frequently overlooked.

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Clinical and Laboratory Notes

ANTI-RETICULAR CYTOTOXIC SERUM AS A MEANS OF PATHOGENIC THERAPY

(In Abstract)

By A. A. Bogolomets

The concept of the body's connective tissue as a physiologic system, though anticipated by numerous scientists beginning with the brilliant investigations of Ranvier, (macrophagic system of Mechnikov, reticulo-endothelial system of Aschoff, etc.), still requires some explanation. The term "physiologic system of the connective tissue" was proposed in 1924 in my work *The Constitution and the Mesenchyme.* The histologic elements of the connective tissue include: clasmatocytes, reticular cells, fibroblasts, adventitial cells, basophilic cells, oxyphilous plasma cells, fatty cells rich in lipase, chromatophores, stellate cells of the liver, epithelioid and granulomatous giant cells; perivascular cells of various organs, reticulo-endothelial elements of the spleen, thymus, etc., monocytes, lymphocytes, osteoblasts and microglial cells of the central nervous system.

The physiologic system of the connective tissue possesses the following functions: (1) trophic regulation of cellular nutrition and metabolism, formation and maintenance of the hæmato-parenchymal barrier, and the function of a depot. Schade drew attention to the significance of intercellular substances and to their rôle as semipermeable membranes through which metabolism takes place between cells and body fluids. These intercellular substances are produced by the physiologic system of the connective tissue. (2) Plastic participation in the regeneration of tissues and in the healing of wounds, ulcers and fractures. (3) Protective. (*a*) Reaction to infection by phagocytic and organizing activity at the site where antibodies are produced. (*b*) Participation in the reaction toward new growths. (4) Autoregulative. Formation of hormones, especially in the spleen. (5) Mechanical. The osseous and elastic skeleton is formed by the physiologic system of the connective tissue.

The physiological system of the connective tissue is the arena in which pathological processes develop and thus the maintenance of this system is one of the most important problems in therapy. In 1900 Mechnikov and Bezredka increased the formation of erythrocytes by injecting small doses of hæmolytic serum, and caused leucocytosis by injecting leucotoxic serum. Mechnikov's chief obstacle was his inability to determine the titre of cytotoxins in serum. In 1908 I had the same difficulty while using cytotoxic suprarenal serum, but after several years it was found that the titre of cytotoxins could be determined with the complement fixation test, using the same antigen for both fixation of the complement and for immunization. Thus we prepared "anti-reticular serum" by injecting human spleen and bone marrow into animals and subsequently obtaining the animals' serum.

Exceedingly small doses of the serum are used in man since larger doses exert a directly opposite effect and inhibit the physiological system of the connective tissue. Following injection of serum there is increased permeability of the hæmato-parenchymal barrier, dilatation of capillaries and relative lymphocytosis. The latter disappears after 3 or 4 hours and is replaced by monocytosis. This also is brief, although monocytes are sent in increased numbers to tissues which require them for several days. Some effects observed with anti-reticular cytotoxic therapy are: (1) Blood pressure in hypertensive cases is permanently lowered. The treatment must be applied before irreversible sclerotic changes have occurred in the hæmato-parenchymal barrier. (2) Great acceleration of healing rate of fractures. In large doses the serum delayed healing. (3) Reduced relapse rate after operation for cancer of the stomach and bronchus. Prof. Kavetski *et al.*, showed an increased carcinolytic serum index after serum injection. This index is lower than normal in patients with cancer. (4) Increased complement in blood. (5) Increased opsonic index of blood. (6) Restoration of the erythrocyte sedimentation rate to normal in many cases, by altering the hæmato-parenchymal barrier so that proteins formed by the physiological system of the connective tissue can enter the blood stream. (7) Prevention of

scarlet fever if given early, and modification of the course of the disease if given later.

A clinical test of the action of the serum is the trypan-blue dermal test. One drop of 0.5% trypan-blue is injected intradermally. The rapidity with which the stain travels toward the periphery indicates the activity of the macrophages which absorb the stain.

We hope that anti-reticular cytotoxic serum will not only mobilize the plastic and protective energy of the physiologic system of the connective tissue, as already proved, but will also prolong the trophic function of the physiologic system of the connective tissue, thus preventing precocious senile fading of the body. (Bogolomets believes that a normal longevity is 125 to 150 years.)

A METHOD OF PREPARING AND PRESERVING ANTI-RETICULAR CYTOTOXIC SERUM

(In Abstract)

By P. D. Marchuk

Antigen is obtained from the spleen and rib marrow of a human cadaver not later than 6 to 10 hours after death. Five to fifteen grams of tissue in the proportion of one to two parts of bone marrow to eight or nine parts of spleen are minced with a knife and washed with normal saline to extract the erythrocytes. The tissue is then ground thoroughly in a porcelain mortar and five times its weight of normal saline added. Half of the resulting suspension is centrifuged for four minutes at 1,000 R.P.M. The supernatant fluid, from which the upper layer of fat has been removed, is injected intravenously into a horse, and the uncentrifuged antigen is introduced orally. The antigen is injected 5 or 6 times in increasing doses at intervals of 4 to 5 days, and 8 or 9 days after the last injection the titre of cytotoxins in the horse's serum is determined by complement fixation. The serum is suitable for use if its titre is not less than 1:100 and hæmolytic titre in relation to human erythrocytes is not more than 1:16. Blood is then drawn from the horse and the serum separated and stored in ampoules. It is cultured to ascertain its sterility, and its toxicity is checked on rabbits and guinea pigs by intravenous and subcutaneous injection of 10 c.c. amounts. The serum is kept in the dark at 4° C. and used within 6 months. It is diluted 1:10 with sterile saline before injection, and the human dose is 0.1 to 0.25 c.c. The diluted serum must be kept in the dark at 4° C. and used within ten days of dilution.

These abstracts have been prepared by Captain Paul S. Rutherford, R.C.A.M.C., and are taken from the *American Review of Soviet Medicine*, 1: 101-113, 1943.

Venereal Disease Campaign

Painless Intravenous Technique

Try the use of an intradermal wheel of novocaine administered with a fine needle, as a prelude to removing blood specimens or administering arsenicals. Patients will be grateful. This technique will permit you to prod around for difficult veins. Patients won't disappear after the first "shot"—never to return.

Latent Syphilis—An "Exclusion" Diagnosis

All syphilis is *latent* at some time in its course. Most syphilis is *latent* at any given time. Diagnosis is established by:

1. Repeated positive blood tests.
2. No clinical evidence of disease.
3. Cerebrospinal fluid negative.
4. X-ray heart and great vessels negative.
5. Supportive historical evidence of syphilis.
6. Supportive epidemiological evidence of syphilis.
7. Exclusion of conditions causing False Positive tests!

Contact Investigation

Somewhere in the community there is at least one contact associated with each V.D. patient's infection.

The physician's *most important duty* is to arrange for this contact to be examined.

The physician and his patient may determine the fate of many.

Where possible, the patient should arrange to bring his or her contact in for investigation.

If this is not feasible, identifying information concerning the contact should be passed to the Health Department for discreet, confidential investigation by specially qualified workers.

"Find V.D. Contacts—Report V.D. Cases"

Editorials

ORAL VACCINES FOR COLDS

FOR the past several years, we have been interested in research upon the prevention and therapy of the common cold. In 1937, Boyd and Connell[1] studied the value of the Benzedrine Inhaler, N.N.R., found that the average duration of colds was 6 to 7 days and that while the inhaler gave relief from nasal congestion which accompanies the common cold, its use did not shorten the duration of the cold. In 1937[2] and again in 1940,[3] it was reported that the average number of colds per winter amongst medical students in this locality is about two, lasting an average of 1 week each and the incidence was not affected by the use of "essential unsaturated fatty acids" or so-called vitamin F. A marked psychosomatic element has been found connected with the common cold,[3] many if not most persons thinking that they have had far more colds than they actually had; many persons will consider a "cold remedy" has done them a lot of good, even though the "remedy" may have been a placebo. Because of this, it is absolutely essential that when a "remedy" for the common cold is studied, patients should be divided at random into two or more groups of approximately equal numbers each, and one group should act as a true control, being given a placebo in the so-called "blind test". In this manner we have been shown[4] that "Resyl", or glycerol guaiacol ether, given in sufficient doses, does not diminish the number of colds nor shorten their duration but does eliminate about 75% of the coughing spells associated with a cold.

For some time it has been our intention to study the value of oral vaccines in the prevention or shortening of the common cold. No practising physician need be told about these; they are widely advertised to him in the medical journals by several pharmaceutical houses who sell them under various names; scarcely a week passes throughout the winter months that the practising physician does not receive in his mail further advertising matter and samples of oral vaccines for colds. Many patients report that these vaccines have been helpful and sales of oral vaccines over the counter in drug stores are large.

The etiology of the common cold is complex. Primarily it is probably due to a virus, but many secondary invaders have been described. The part played by these so-called secondary organisms is difficult to assess. The general consensus seems to be that they play an important part in prolonging a cold. This is certainly true should complications, such as sinusitis, otitis media, pneumonia, etc., develop out of a common cold. On the other hand, in the majority of common colds, no such complications arise and I am inclining more and more to the belief that the so-called secondary pathogenic organisms are of little importance in these cases. This conclusion is based upon our observation that the average duration of a cold has been the same for the several years we have kept track of it here.

The idea behind oral vaccines for colds is that they will prevent the development of symptoms due to these secondary micro-organisms. Upon theoretical grounds, this idea is open to two serious criticisms. First, it assumes that immunity can be built up by oral administration of a vaccine. Secondly, it assumes that this immunity having been built up, colds will at least be not as severe and will not last as long.

However, the test of a pudding is in the eating, and the value of oral vaccines for colds can be proved or disproved only by actual trial. Again, it must be emphasized that the trial must be made between the oral vaccine and a placebo of similar appearance, using numbered containers so that neither the patient *nor the investigator* will know at the time which preparation is being used. It is essential that the investigator know only the number of the preparation and be kept in the dark regarding whether it is the drug reported to be of value or a valueless placebo, at the time he is giving it to patients, because the investigator as well as the patient is subject to human weaknesses, and should he, for one reason

1. BOYD, E. M. AND CONNELL, W. F.: *Am. J. M. Sc.*, **194**: 678, 1937.
2. BOYD, E. M. AND CONNELL, W. F.: *Canad. M. Ass. J.*, **37**: 38, 1937.
3. BOYD, E. M. AND CONNELL, W. F.: *Canad. M. Ass. J.*, **43**: 365, 1940.
4. STEVENS, M. E., RONAN, A. K., SOURKES, T. S. AND BOYD, E. M.: *Canad. M. Ass. J.*, **48**: 124, 1943.

or another, consider *a priori* that the drug is good, he will tend to note in his records that the cold lasted the shortest number of days mentioned by the patient and *vice versa*. This follows from the well-known fact that it is difficult to state the exact day a cold began and the exact day it stopped, so that a patient may state it lasted "eight or ten days", or even a "week or two". It has been my practice to take the mean of the extremes when a patient is not certain of the exact dates.

A good recent review of the literature upon this subject is given by McGee, Andes, Plume and Hinton[5] of the medical department of the Hercules Powder Co. They conclude that data published in favour of oral vaccines for colds are, "unimpressive, incomplete and poorly documented", and they go on to report upon the use of these vaccines in 1,062 persons in five plants or offices scattered over the U.S.A., from which they conclude that such vaccines, whether given orally or parenterally, are useless as a prophylactic against the common cold, Recently, in "Current Comment", the *Journal of the American Medical Association* notes[6] that there is a "recognized lack of scientific evidence for the value of these preparations" and that physicians who prescribe them and firms which sell them, "are perpetrating an unwarranted commercial assault on the public pocket book".

To find out for myself the value of oral vaccines for colds, I enlisted the aid of my class of medical students and staff during the winter of 1943-44. The group comprised 48 persons, half of whom were given an oral cold vaccine in the doses recommended by the manufacturers* and the other half a placebo capsule of identical appearance and shape. Each person in the group was interviewed once a week for a period of 17 weeks and the onset and duration of each cold noted.

At the end of this period, there had occurred a total of 80 colds in the entire group. In the 24 persons who had received the oral cold vaccine there were 46 colds or an average of 1.9 colds per person; in the placebo-treated group, there were 34 colds or an average of 1.4 colds per person. Thus the use of the oral cold vaccine had not decreased the number of colds in this small series of cases. In the group receiving the oral cold vaccine, the average duration of colds was 6.6 days; in the placebo-treated group, the average duration was 6.9 days. Again there was no significant difference between the two groups in the duration of colds.

The obvious conclusion from these studies is that oral cold vaccines, or at least the one studied, which exemplifies this group of preparations, are of no value in preventing the onset nor in shortening the duration of the common cold.

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5. McGEE, L. C., ANDES, J. E., PLUME, C. A. AND HINTON, S. J.: *J. Am. M. Ass.*, **124**: 555, 1944.
6. Current Comment: *J. Am. M. Ass.*, **124**: 236, 1944.

*Entoral was used in these studies.

REALLOCATION OF PHYSICIANS

THE distribution of physicians throughout the country has only become an acute issue within these last five years. On looking back however it is quite apparent that the inequality of distribution now so sharply evident was really steadily becoming more marked, even before the crisis of war suddenly accentuated it to an extreme degree.

That our conditions in Canada are mirrored in those obtaining in the United States may be gathered from a recent address by Dr. J. W. Martin (*J. Am. M. Ass.*, 1944, **126**: 203) on "The Relocation of Physicians". In times past, Dr. Martin shows, even at the beginning of the century, there were physicians in every small community "even at some of the cross roads". But the tendency to locate in larger centres has been overwhelmingly strong, and now rural physicians are not only numerically fewer, but chronologically older. Three factors are named as mainly responsible for this maldistribution; low income, lack of essential facilities and professional isolation, but as Dr. Martin points out, whilst the remedial measures are obvious they may not be simple to apply. He adds: "Matters are further complicated by questions involving both social policy and political expediency". He feels that the opportunity for redressing the balance will come with the cessation of hostilities, since there will be such a large number of medical

men available who have never been in practice. The deterrent factors mentioned however, must be overcome, if not in one way then in another. Insurance methods might help materially or there might be some degree of subsidy for physicians who could not be assured of satisfactory financial return in certain areas of practice. It is very important that in such districts provision should be made for diagnostic and therapeutic facilities. Another suggestion is that of more effective utilization of those physicians who do elect to remain in remote or isolated regions. Responsibility for all calls at all times is not only too great a tax on one man's strength, but leads to waste of energy. Dr. Martin quotes unpublished data of studies which show that if maximum use is made of the professional capacity of physicians at all ages up to 70 years, "the total volume of physician service available to the general population might be increased by one-fourth". This, however, can only be attained by the co-ordinated work of men in groups, preferably in connection with hospitals or health centres. The provision of periodical refresher courses should be an essential feature of any scheme for improving and extending medical practice.

As has been said, these problems have to be faced in Canada as well. We are fortunate in having already gained a birdseye view of the distribution of our medical personnel through the work of the Procurement and Assignment Board. This is indispensable, but the reallocation of men when they return still has to be considered. It is realized that there will have to be a period of rehabilitation, which in itself is receiving most careful study. The further problem of inducing men to take up country practice will then have to be dealt with.

Much time and thought is being devoted to these problems, but the war is not yet over and at present the machinery for handling them can only be set up on paper.

Revolutionary politics have one of their sources in the idea that societies are capable of infinite and immediate modifications, without reference to the deep-rooted conditions that have worked themselves into every part of the social structure.—John Morley in *Edmund Burke*, p. 51.

Editorial Comments

Cutaneous Tests

Our method of diagnosis by skin tests is undergoing critical review. It is nearly 25 years since this method of detecting sensitivity was developed. In that time there has been the spectacle familiar in medicine of over-emphasis followed by more careful evaluation. Dr. Louis Tuft (*J. Allergy*, 1942, **14**: 355) has contributed such a criticism, and sets forth a clear statement of the mistakes that have been made. Skin tests were at first hailed as a ready key to many allergic problems of diagnosis. It was not long before it was realized that not only did they often fail to solve the problem, but they gave information which was frequently misleading. Cutaneous tests may give a positive finding, or they may not. But what does a positive reaction signify? Does it mean that the substance to which the reaction is obtained is the cause of the allergic symptoms under investigation? The answer is, not necessarily. In certain types of sensitivity, hay fever being the best example, a cutaneous reaction is not only a fair guide, but it usually fits in with the clinical history. In asthma, particularly the large group having a chronic infectious basis the tests are far less convincing. Often they reveal nothing: sometimes they indicate sensitivity to substances to which the patient is never exposed, and even if there is such exposure the subsequent avoidance may have no effect on the asthma. Then there are types of disease such as eczema and the œdemas which have been squeezed into the allergic fold, which are now recognized to give rise only rarely to detectable cutaneous sensitivity.

When all these points are considered it is evident that skin tests must be relegated to a minor though still well recognized rôle. It is time that this be realized, for there are still too many practitioners who pin their hopes on these tests. A careful history is infinitely more important, as well as being within the capacity of any doctor. But the public themselves are not wholly without blame in the matter, for they will often demand to have skin tests done, thinking that they have some mysterious curative power.

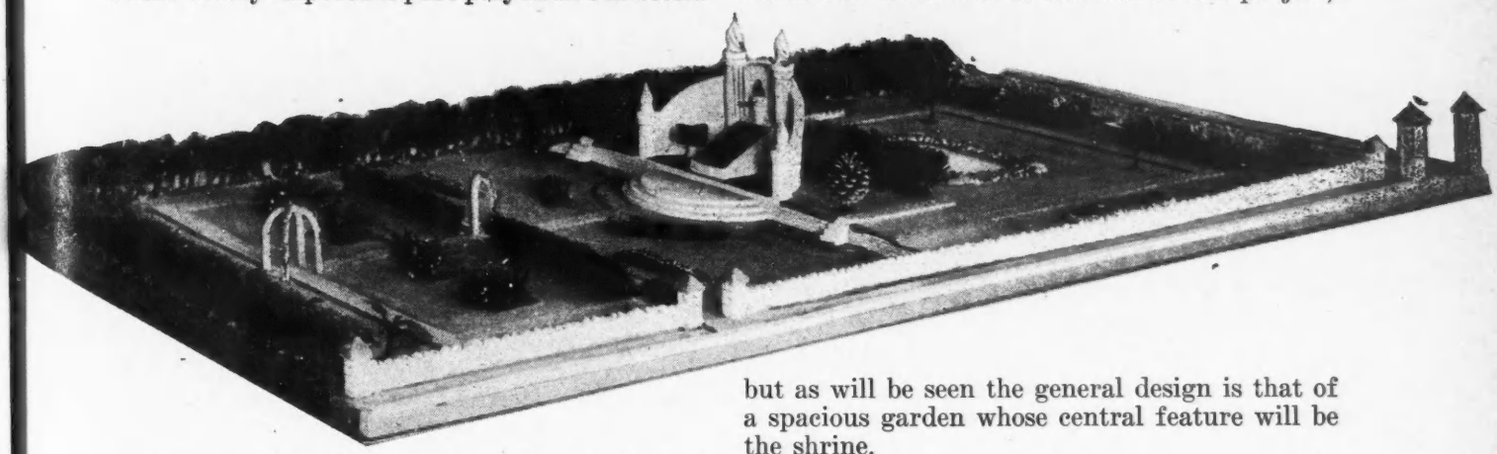
The Growth of the Pharmaceutical Industry

We note with interest the anniversary issue of *Drug Merchandising*, marking the 25th year of this publication's appearance. The impressive expansion in the pharmaceutical industry within the last 25 years is well described in this number. This expansion covers an extremely wide and varied field, and involves the continual effort and thought of large and important professional groups. Due reference is made to the outstanding developments in chemotherapy and there are interesting notes on packaging, (that

unobtrusive but all important factor in distribution), narcotics, plastics, vitamins and blood substitutes, to name only a few subjects. The new Minister of National Health and Welfare in his congratulatory message pays due tribute to the vitally important part played in our social system by the drug trade and industry of Canada and to this we would add our congratulations and best wishes.

The John McCrae Memorial Garden

We take pleasure in drawing attention to a plan for a memorial shrine to the memory of the late John McCrae. This is being sponsored by the Colonel John McCrae Memorial Branch of the Canadian Legion of Guelph, the birthplace of John McCrae. Two lots of land beside the McCrae homestead in Guelph have been donated to the Branch, and it is intended to build a Garden containing a memorial shrine symbolic of "In Flanders Fields". We subjoin a picture of the original model of the Garden. There have since been some alterations in this project,



but as will be seen the general design is that of a spacious garden whose central feature will be the shrine.

The memorial is not only a thing of beauty in itself and one which will permanently adorn the city of Guelph, but it stands as the expression of tribute to one who spoke with a national voice in words which have a place in our national literature.

We understand that the preliminary work is now well under way, but the Branch is still campaigning for the funds necessary to complete the plan, and will be glad to receive contributions. These should be sent to Mr. A. L. Shepherd, 61 Lyon Avenue, Guelph, Ontario.

Medical Economics

HEALTH INSURANCE IN NEW ZEALAND*

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HISTORICAL

In spite of various omens from World War I onwards, including a departmental report on the subject in the declining months of the National Party's Government in 1935 in New Zealand, health insurance became a live issue only with the election of the first Labour Government in November, 1935.

From February, 1936, to September, 1938, the Government formulated its plans for its Social Security Bill, which was presented to the House in September, 1938, and was passed and became law soon after. Various committees travelled the country and prolonged negotiations between the government and the British Medical Association took place. The B.M.A. put forward its views, which had been worked up and agreed to by all branches. They included a complete medical service for the indigent, and a contributory system of insurance for all others who were unable to provide themselves with hospital, laboratory and specialist services. The family doctor's services should be provided by the people themselves either privately or through friendly societies. Reform of the hospital system was also proposed. The government did not explain their proposals fully but hinted at a universal, free general practitioner service, with specialist services later.

These negotiations were unhappy and unproductive. The government were not at pains to conceal their disapproval of the B.M.A., but were never frank about their own intentions. Indeed only after the Social Security Bill was introduced into the House were its contents made known to the B.M.A. There is no doubt that the Bill was political in its conception, and that technical considerations were almost entirely ignored.

*Written in September, 1944. Prepared by special request.—EDITOR.

The Social Security Act, 1938, had two main objects. It was intended to substitute for the existing system of non-contributory civil pensions a system of monetary benefits on a contributory basis. It also made provision for the inauguration of a system of medical, hospital and related benefits. The money was to come from a new social security tax of one shilling in the pound, payable by practically everyone in the community, and replacing the old unemployment levy of eightpence in the pound, payable by a more limited clientele. The social security tax came into force on April 1, 1939, and has been regularly collected since.

The medical benefits were to consist of a general practitioner service available to every person in the community. Maternity benefits available on a similar basis were limited to such service as a general practitioner ordinarily gave. Pharmaceutical benefits were to include all ordinary prescriptions and appliances. Hospital benefits were to consist of the payment to the hospital (whether public or private) of a portion of the fees charged to the patient, thus relieving the patient in part, and ensuring to the public hospital authorities payment where sometimes—as with the indigent and the elusive—there had been none.

Apart from these four benefits, the Bill foreshadowed, but did not provide for, a number of others, for example, radiological, laboratory, anæsthetic, specialist, and consultant, dental, ambulance, home nursing and domestic assistance benefits.

Soon after this there was a general election, hotly contested largely on the social security issue. Members, including high officials of the B.M.A., were prominent in the campaign, mostly for the National Party, and the S.S. Act was freely used in endeavours to discredit the Labour Party. It was, however, returned with an absolute majority. It was returned again in 1943, with a much less substantial majority. On that occasion social security was not a dominant issue.

INAUGURATION OF THE VARIOUS BENEFITS

Early in 1939 negotiations between Government and B.M.A. were resumed, but they were never fruitful. It became a matter of the government introducing benefits in turn, and being obliged to alter them under protest from the B.M.A. and other quarters.

Mental hospital treatment was made free to everyone in April, 1939. The mental hospitals of New Zealand are conducted as a government service and system.

Maternity benefits were proposed in April, 1939. The terms of contract between government and doctor were considered irksome to both patient and doctor, and there was no provision for consultant help. Only two doctors accepted the contract. Later alternative proposals were brought forward, and after negotiation on good terms between government and the B.M.A., the benefits came into force in November, 1939. The plan is payment per service rendered, with no contract, the patient certifying the service on a form which then becomes a claim on the S.S. Fund. The fees are considered "satisfactory to good" (no bad debts) and include £5. 5. 0. per case—prenatal, confinement and post-natal service. Extra fees are allowed for toxæmia, blood transfusion, consultation, mileage, etc., etc. The patient also has the bulk of her hospital fees paid, even in a private hospital. Proprietors of these hospitals are well pleased, though some people complain that hospital fees have risen steeply and that the patient is no better off. Maternity benefits are generally considered the best of the bunch in practice; they give general satisfaction. General comments are reserved for later on.

Hospital benefit. This was introduced in July, 1939. It made the services of the public hospitals entirely free to all. The main step enabling this was the payment to the hospital boards of six shillings per patient per day, later raised to nine shillings, together with sums for out-patient attendances, x-rays and physiotherapy, etc.

It should be made clear that the public hospitals are controlled by statutory boards serving areas of different sizes. They were financed—until this change—in about equal proportions from local rates and National Government subsidy. The S.S. change gives the government a much greater responsibility for finance, but has not yet altered the system of control by the boards, all whose members are popularly elected.

Private hospitals also receive this nine shillings per patient per day, but fees have risen so steeply of recent years that the benefit to the patient is hardly noticeable.

In assessing the value to the people of these hospital benefits, it must be remembered that, particularly in some of the large cities, the public hospitals have lagged far behind modern standards and are feared by a proportion of the people. There is often no out-patient department at all, or, if present, it is often inadequately housed and staffed. In addition, the pressure on hospital beds, together with war conditions (military patients and absence of medical staff etc.), makes the service often illusory. For months on end only patients with acute conditions will be admitted, and the patient with a hernia, for example, cannot claim his hospital benefit. In some instances there is a notorious absence of the best medical talent in the town from the hospital staff, and the public is well aware of this. In general, too, building programs are years behind requirements and innumerable improvisations of accommodation commonly occur.

Another accompaniment of hospital benefits was the cessation of the honorary system of staffing. The part-time staff now receive varying sums (£500 per annum for a senior and

£250 for an assistant physician or surgeon) for their work. In some instances, of course, there was already a full-time "closed staff". This carries on, and, as might be expected, it is usually overworked and sometimes underpaid.

The pharmaceutical benefit came into force in May, 1941, with little notice to the chemists. Any chemist can contract to give the service, which is well paid, especially when mixtures are repeated. The patient pays nothing; he merely hands in his prescription, and countersigns it when he receives his bottle. As time has gone on, the "free" list of drugs has increased, and now includes all hormones except gonadotrophic, and all the sulfa drugs. There has been a considerable increase in the use of the older type of mixtures. The chemists have increased clerical work, costing each item and sending in copies of prescriptions, but seem well pleased.

Radiological services, both diagnostic and therapeutic, were made free in public hospitals in August, 1941. Private radiologists work on an agreed schedule of fees, the patient paying roughly 50% and the S.S. Fund 50%, and appear well pleased. Specialist radiologists are recognized as fully "viable", part-time radiologists have a claim only for certain services.

Physiotherapy in 1942 was made free to all in public hospitals and government spas, and in 1943 a schedule of fees was agreed to by private practitioners: 50% of the fee is paid by the patient and 50% by the fund, the latter figure being arrived at as the cost of giving the same service in a public hospital. The average fee is seven shillings per treatment, of which the patient pays three shillings and sixpence. Extra may be charged when the practitioner visits. Everyone is well pleased, but there are not nearly enough practitioners in either hospital or private practice to do the work.

Medical benefits, or *the general practitioner service*. With the outbreak of war and the sending of many active medical men into the armed forces, many overseas, a lull in proceedings took place until February, 1941, when the new Minister of Health (Hon. A. H. Nordmeyer) announced that the G.P. service would begin forthwith. It was to be a capitation service available to all, the doctor to receive fifteen shillings per annum per patient (man, woman or child) on his list, with extras for mileage. The contract was to be between patient and doctor, with free choice and right of refusal. The patient was to take a card to the doctor of his choice and have it countersigned. No limit was imposed on the doctor's list. There were a number of penalties for dereliction of duty.

B.M.A. spokesmen kept up hostile exchanges with the government in the months preceding this announcement. The government had not consulted the association, the scheme was not a good one, and even if it were, it would be quite impossible for the doctors to undertake it, with 25% of their members and their most active section abroad on military service, and the remainder overworked with civil and military demands at home, to say nothing of immediate and remote demands which might be much heavier still.

The people were remarkably apathetic and were slow to enrol. The trades unions and others exerted pressure on their members to seek willing doctors. Wisecracks were uttered in the house by opposition members of parliament about "first catching your hare". As time went on it became apparent that only a few doctors were enrolling patients; in the largest city only one man; more in scattered country districts. In all, only forty to fifty men out of a possible seven hundred or eight hundred were found six months later to have undertaken the service.

In certain country districts, particularly one-doctor areas, the scheme is reported to be working well, having been embraced by all sections—political and social—of the community. The doctor is pleased with the more dignified relations with his patients and is often better off financially. No undue demands are made upon him. In the case of urban men, good reports are also given, though in both cases it must be remembered that the men working the scheme were predisposed in favour of it.

Its failure as a general solution for the country led to the "second version", to be mentioned later. Opposition from the B.M.A. was determined, though no tremendous internal efforts were made to harden the front. Preoccupation and overwork on the part of the doctors kept many of them aloof from any active struggle.

There is no doubt that the people were surprised and disappointed that the onus had been placed on them to find their doctor, after paying the social security tax steadily for two years. Official B.M.A. comment at this stage ran as follows: "The government was in the position of a broker who had sold to the public (and taken the money) something which he did not possess, had made no arrangements to obtain, and was unable to deliver. The position now is that the broker has confessed his inability to fulfill his contract, and says to his clientele: 'If you can get this for yourselves, I will pay.' "

The government continued for some months to hope that the doctors would gradually come in, and as time went on began to issue threats of coercion, which rather inclined public sympathy towards the doctors.

A general election being due in November, 1941 (it was later postponed for twelve months), the tax for social security having been collected for more than two years and the promise of the main benefit (general practitioner service) being still unfulfilled, the minister, the Honourable A. H. Nordmeyer, proposed at the end of August, 1941, a "fee-for-service" plan. The B.M.A. had not publicly altered its official plan

of some four years' standing, but it was known that a section, chiefly general practitioners, was willing to consider a "fee-for-service" plan. There was a general dislike in the profession for a panel scheme of universal application, and the doctors still considered it a bad time to make any major change with 25% to 30% of their number abroad or engaged full time in military duties at home.

The National Health Insurance Committee of the B.M.A. met the ministers towards the end of August and subsequently, but as the nature of the new proposals became apparent, hostility rapidly developed. The first version was that from a "bottomless pit" a fee of 5s. would be paid to the doctor per attendance at his rooms, 6s. 6d. in the case of a visit to the patient's house, and extras for mileage, etc. It was to be illegal for a doctor to collect fees in any other way. A public outcry was raised, doctors, clergy, Chambers of Commerce, etc., joining in, and meetings were held all over the country. The government gave in to the extent of raising the fee from 5s. to 7s. 6d., ("the B.M.A. sold their soul for thirty pieces of copper") and 12s. 6d. for night and Sunday calls, and also in leaving it open for patients to enter into any private arrangements they liked with doctors. In this form the proposal became law in September as an amendment to the *Social Security Act*, the inauguration of the service being postponed from October 1 to November 1, 1941.

The service thus begun has been in operation nearly three years. The extra demands of a "free" service on a medical strength depleted by war service have enhanced the difficulties. Confusion occurs because of the five different methods of remuneration available:

1. A salaried whole-time service exists in a few rural areas.

2. The capitation payment persists with those doctors who undertook it in the first place. They prefer it to the later methods.

3. The fee-for-service system—that intended by the Government to be standard, but opposed officially by the B.M.A.—is freely used. Here the patient signs a form saying that service has been rendered, and the doctor sends a heap of forms to the Health Department each month, and receives 7s. 6d. per service. This is simple and labour-saving to both patient and doctor, and has gradually been adopted by many doctors in spite of B.M.A. advice.

4. The Refund System whereby the patient pays a "token" fee—usually 3s.—and signs the form as in 3 as well, the doctor collecting as in 3.

5. The patient pays the doctor his fee—usually 10s. 6d. as formerly—gets a receipt which he then takes to the Post Office, and gets a refund of 7s. 6d.

The B.M.A. approves of 5, but not of 3 and 4. In practice, however, simplicity and convenience tend towards the greater use of 3. The B.M.A. would like to see the government make only one form—preferably 5—applicable.

Much could be said about the working of the G.P. service. Some general comments are reserved for the next section. Most of the methods are open to obvious abuses by both patient and doctor. The cost to the government must be tremendous, but no one knows what it is. Even mediocre or poor practitioners are "doing well", and make £3,000-£4,000 per annum easily. The more businesslike are said to reach £8,000-£10,000 through organization. Wartime taxes of course decant the bulk of these higher earnings, and after a while the doctors tend to go easy and refuse night calls, etc. This might be different after the war when competition becomes keener. There is a tendency to earn the easy 7s. 6d.—filling certificates, repeat visits etc., and pass on more difficult tasks to hospitals. The hospitals and specialists are thus flooded with work the G.P. is paid to do but avoids.

The scheme, in essence, is not a new medical service at all; it is a new method of paying for the old article, now retailed under more difficult conditions.

Remaining benefits; dental service, laboratory service, and specialists' service. These have not been arranged. Both hospital and private pathologists hope their arrangements will be delayed as there are not a quarter of the men, rooms, or materials available to do the work. As regards specialists, the only step has been to make a refund of 7s. 6d. available per service rendered—either a consultation, an operation, or a postoperative visit—whatever fee the specialist chooses to ask. This has been variously regarded as a political gesture to the people in lieu of arranging a specialist service, and a device to force specialists to give receipts for all monies received, and so be liable for income tax. There is no doubt the specialists have less pocket money than before. They are also obliged to keep daily records of all visits to private patients in hospitals, as each one allows another 7s. 6d. off the bill. Some "specialists" have been known to use assiduous visiting of an appendix case in a private hospital as a means of beating up a sizeable fee for themselves (to be largely refunded to the patient by the government) in the case of a poor patient who would otherwise go to a public hospital.

COMMENTARY

1. *The epoch-making principle of universal free service on the basis of a social security tax has been established.* The resulting service, at present, may be criticized, but the principle promises to go on. New Zealand has previously shown an early impetus towards similar reforms, but has the disconcerting habit of going off the nest once the egg is laid. Other countries later introduce the same principle, but build on it more soundly, achieving the goal

sooner than New Zealand in spite of its flying start. An obvious parallel seems to be developing in Britain with the Beveridge proposals and the White Paper on a National Health Service (February, 1944). All credit must be given to the labour government for introducing the principle, whatever we may think of their methods of filling in the details. The principle seems to be accepted by almost all the people.

2. *Is the financial basis sound?* The present tax of 1s. in the pound, or 5% of earned incomes seems far too small to provide all that is promised. Even assuming the present 1s. 6d. War Tax be later added, 2s. 6d. in the £, or 12½%, is less than Beveridge estimates for similar services in Britain. The public does not know how much is paid out by Social Security, but has an idea the money is not efficiently spent in many directions—pharmaceutical, hospital, G.P. services, etc. The fact that much of the money poured out to any G.P. who will busy himself on innumerable minor attendances returns to the government by income tax is not an answer. Many young and inexperienced practitioners already have become convinced that they are worth £3,000 or £4,000 per annum to the community, while a Professor of Medicine gets £2,000.

3. *Neither the men nor the material were (or are) available to give the service.* This was well known to be the case, even before the war, which made things much worse. The B.M.A.'s comment, quoted above about the dishonest broker, has therefore much substance. No evidence appeared at any stage that the government knew, or tried to ascertain, what their promises involved. They simply said "X-ray benefits will begin next Monday", and let the people and the radiologists sink in the ensuing mêlée. The men and the machines are there in about one-quarter the quantity required to make the service an honest one.

This suggests that the motive and the method on the part of the government were entirely political, and that the professional and technical sides were ignored.

4. *The content and quality of the services offered.* Whether we think of maternity, hospital, pharmaceutical, or medical benefits, there appears the tacit assumption that past standards and methods left nothing to be desired. The old wine was to be sent out in new bottles by a new management.

At no stage did anyone propose taking even a small percentage of the money to be paid out under each heading and devote it towards objects such as these:

(i) A postgraduate teaching and research hospital in obstetrics and gynæcology, and an obligatory scheme of refresher courses for those doctors and nurses giving service under maternity benefits.

(ii) A postgraduate school and scheme for those rendering general practitioner services.

(iii) A pharmacological institute for standardization—perhaps even preparation—of many of the new hormones, vitamins, and chemo-therapeutic agents so widely needed, and for research into new products, particularly of native origin.

(iv) Clinical research departments in the big public hospitals or hospital reform generally.

5. *Reason for these failures:* or *how not to do it.* On the one hand we had a Labour Government fired with the general idea—call it political, or humanitarian, as you will—of a universal free medical and health service. They were elected and re-elected twice, on the issue, and the principle has been accepted since in Britain by the Coalition Government and the people as a desirable and necessary post-war pattern.

On the other hand, we had a professional organization not so fired. They were apprehensive about the changes threatened, and suspicious of the methods and motives of the government. They appeared—and appear still—to be unaware of the extent of public feeling in the matter. They have presented hitherto a united front of opposition officially—to some extent imposed on private members from above—but have connived freely in the rewards offered. It is doubtful if the opposition could have been sustained in the face of medically sound proposals from the government. No suggestions such as the four mentioned in 4 immediately above ever came from the official B.M.A. spokesmen nor from the national medical school.

The health department, through its high officers, deny all share in the paternity of these schemes, though they administer them faithfully.

The schemes were brought on in war time by the government under these conditions without any medical advice or guidance, so far as is publicly known. This is the reason for their failure as competent schemes for public welfare and medical progress. Each observer will apportion praise or blame differently. *In toto* the experiment is of value chiefly as an example to the rest of the world in *How Not to Do It.*

THE FUTURE

The future is not promising. "Creative power" on the government side seems to be waning. Certain hopeful proposals, *e.g.*, the amalgamating of small rural hospital districts, and the addition to them of social security resources, to produce a competent organized service, and the trial of co-operative groups in general practice, are extremely tardy in reaching reality. There may be a new government in office in two years' time. The B.M.A. officially is still reactionary, as shown by its Provisional and Draft Final Reports of 1944. Whether this state will persist when the overseas service doctors return remains to be seen.

The hospital system remains unorganized, and quite inadequate to its heavy tasks.

The new feature, as far as New Zealand is concerned, is the evidence now forthcoming that Britain is steadily planning a national health service. In time—perhaps a long time—that should bring about a realization by all parties, including the doctors—that such a service is both desirable and inevitable in New Zealand. All parties will then need to co-operate to bring it into being. This will be no easy task, even in a small country. Many years of building will be required. Some of the younger medical men seem to wish the plans were being made. A good deal may depend on the soldier-doctors. Yet to give them a good chance to re-establish themselves, such a scheme would seem to be wanted at once. The people certainly need it also.

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41 Symonds St.

PROBLEMS IN MEDICAL ECONOMICS*

By J. Harris McPhedran, M.D., F.R.C.P.(C)

President, Canadian Medical Association, Toronto

I have thought that it might be well to speak briefly on three things that have, from time to time, exercised the minds of all who give our present-day problems any consideration, namely: (1) Our present scheme of the practice of medicine. (2) Can we improve our present system? (3) Is Health Insurance the answer to our problem if changes are inevitable?

MODERN MEDICINE

Our present system of practice has evolved slowly in keeping with the advances in science, especially during the past 50 years. The foundations for such advances have been well and truly laid in times past, through increased knowledge of anatomy, physiology, histology and clinical medicine, the discovery of the microscope and electricity. But within the lifetime of many present today increased knowledge and its application have gone ahead by leaps and bounds. Some of you came to the Province when transportation was primitive; the horse and saddle, buggy or cutter were the more frequent and sometimes the only means of serving the scattered population. Many diseases, now curable, got well with no help except kindness and reassurance or died while you looked on, helpless. Operations were performed in the home for the most part, under very trying and difficult conditions. Often hundreds of miles had to be travelled to reach the nearest hospital, tuberculosis ran riot through many a family. The family doctors worked hard, day and night; fees were low and payments uncertain.

The changes that have occurred throughout the intervening years have been phenomenal. Transportation has become easy, by train, motor car, and by air. Hospitals, equipped with all modern facilities for diagnosis and treatment, are scattered here and there all over the Province. Public health measures for the control of infectious diseases, water and food supply, construction of the home, have been implemented. Institutions for the treatment of cancer and tuberculosis have been built and staffed by those with special training for the diagnosis and treatment of these diseases. Travelling clinics have been inaugurated. We have lived to see tuberculosis, diabetes and pernicious anæmia controlled, the dread of cancer in large measure removed. The x-ray and biochemistry now make possible an early diagnosis and therefore the treatment of disease more certain of success. Meningitis, pneumonia, gonorrhœa and syphilis have been robbed of their terrors.

All these things have been done within a few years. Yet, we are not satisfied. We are on the march to other, and perhaps greater triumphs in the prevention, management, and cure of disease. Whilst true, these advances in medicine still go unappreciated by the uninformed.

We can still go a long way in the prevention and cure of disease and disabilities with the facilities at hand, were such within the reach of every person in this country. Examination of army recruits brings this into the spotlight.

In spite of all our efforts and successes there are still barriers interposed between those receiving and those giving health services,—barriers that can be removed by the co-operation of all groups concerned; the profession, the people, and the government.

HOW TO IMPROVE THE CONDITION

Question 2 arises. "Can we improve our present system of practice?" We can and we should. The very foundation of any improvement however, is education, education of ourselves, education of the people and thus our governments.

It is a common experience that people will spend money freely on everything but their own minds and bodies. The house must be repaired, machinery must be bought or replaced, roads must be built, but man is neglected by man himself, till it is so often too late to use other than palliative measures. This is deplorable since today so many diseases can be

*Address before the Canadian Medical Association, Alberta Division. September, 1944

prevented or cured if people will give more care to mind and body rather than the material things with which they hope to secure greater comfort and happiness—useless things unless there is a sound mind in a sound body. Therefore, I repeat, the basis of any change for the better is education. Please do not misunderstand me when I speak of education. I do not refer solely to the accumulation of knowledge, which is important, but by itself will lead us nowhere. I mean also, a better appreciation and application of the relative values of things spiritual and things material. Many of our anxieties and worries are due to lack of this balance within ourselves, leading to, or aggravating actual physical diseases. To these latter conditions we have devoted much time and study and with good effect but we have shut our eyes to the personality, the psyche, the ego disturbance of which may be fundamental and in any case is of major importance.

Now, this necessary change in our outlook is vital in these days of social unrest. It is necessary in our teaching and essential in our practice if we are to strike at the fundamental causes of disease, whether of mind or body.

No opportunity should be lost (if legislation is to be given proper direction) to educate our patients as to what has been done in the past in the field of medicine and how we should progress. This education can be done through individuals, through groups, and various organizations. Each doctor or group of doctors should make himself or themselves responsible for carrying this teaching into effect in each community in this Province, to the end that an informed public may lead to an informed legislature and thus enlightened legislation. It is fitting therefore, that we, as a national body should have a definite program to accomplish this end. We must now go further than voicing principles and must get down to the practical application of these principles, to the end that, better conditions of life and health may evolve slowly but steadily. This problem is not solely for your Division or even the National Association. It is the problem of each doctor in this Province. Take the coming months to study the history of medicine, its tradition, its achievements. Study the present conditions of practice and then put into writing the steps that, in your judgment, might be taken to ensure better health. Discuss these with your colleagues and your friends, with groups and organizations. If this is done we shall have fewer "blue printers", fewer "Utopians", better legislation and more hope of its implementation.

HEALTH INSURANCE

Is then Health Insurance an answer to our problem of better health services? (1) Can we provide our part of the health services as outlined in the Ottawa Bill. (2) Is the proposed administration set-up satisfactory? (3) Are the estimated costs sufficient to provide the services? (4) Is it foreseen that the health insurance visualized may ultimately lead to state medicine? In that case would such a system prove satisfactory?

To the first question it seems one must answer that our part of the services as outlined in the Dominion Bill cannot now, nor for some time to come, be implemented. We have not the necessary medical personnel, the hospitals and the equipment, the nursing personnel, to make possible the introduction of such a scheme. It will take years to provide these under any administrative set-up that will be fair to all concerned and free from control by bureaucrats and petty officials. We have asked for administration in each Province (since matters of health still come under the control of each Province) by a non-political independent commission. There has been no indication in the Provinces that have recently passed Acts of Health Insurance to grant such a method of administration. Here is educational work to be done of the greatest importance, if we are not to wake up some fine morning and find ourselves civil servants, under the control of a Minister of Health.

Even the proposed Dominion control needs a little quiet reflection. Should the consent of the Provinces be obtained for revision and alteration of the B.N.A. Act, and control in Health matters given over to Parliament, we would find ourselves completely under the jurisdiction of the Department of Health at Ottawa. A large Committee, purely advisory in function, would be the only channel through which the views and wishes of those giving, and those rendering the services, might be laid before the Minister. Let us be warned by what has happened at Ottawa in regard to control of civil aviation:

> "Recently was witnessed in our Parliament the creation of a Commission which is to control the whole future of civil aviation in this country. The only appeal against the discretionary powers of that Commission is to the Minister who in the final instance must approve its rulings."

In other words, he makes the rules and then sits in judgment on questions that may arise from them.

We should be cautious and reconsider this administrative plan carefully. We should not be too easily lulled to sleep by the assurance that the Dominion is concerned only in satisfying itself that each Province is living up to its agreement to provide the services set forth in the Act, in order to receive monetary aid from the Dominion.

So far as the proposed administration in the Provinces under the Ottawa Bill is concerned there can be no cause for complaint, as it is in keeping with our principles and can be varied to meet the wishes of the different Provinces. But in no instance has any Province which has enacted health insurance legislation in the

sessions just passed, shown any disposition to form an independent, non-political commission.

If we are men of our word and mean what we say we shall insist on a non-political commission representative of all those giving and receiving the services and as independent of political control as may be. If we are mice, then we shall scuttle for cover at the first breath of governmental opposition. Which shall we be? I have been alarmed and discouraged by the action taken by the council of one Province when this matter became a real issue and opportunity was given to live up to our oft repeated principle respecting administration.

What about the costs of Health Insurance as set forth in the Heagerty report to the Social Security Committee? Our own actuary, Mr. Wolfenden, says the estimated costs are too low and based on faulty premises. This view is largely supported by Mr. V. R. Smith, General Manager of the Confederation Life Insurance Company. We would do well to keep in mind the effect on taxation of the New Zealand Social Security legislation.

	1935	*1939*	*1942*
Total taxation in New Zealand excluding war taxes	£20,177,000	£32,810,000	£46,220,000
Taxation per capita of population excluding war taxes.....	£13/8/2	£21/17/6	£30/16/5
Public Debt of New Zealand excluding borrowings for War (in millions of pounds).....	£280	£304	£342

May we not stop to ponder where all our social security measures in effect or under consideration are likely to lead us? Therefore, I ask you as taxpayers to consider seriously all social security measures and especially the estimated costs of health insurance, which we are warned on good authority are likely to be $350 to $400,000,000 per annum, rather than the estimated $250,000,000. It is interesting in this connection to note that the Social Security Committee at Ottawa has not been able to agree on the financial structure of the proposed Bill, so that this Bill, if reported to the House will be minus any recommendations in regard to costs.

Whither are we tending? Judging from the last proposals of the Social Security Committee at Ottawa, we are not facing health insurance but state medicine, inasmuch as $100,000,000 would be contributed by the Provinces, $100,000,000 by the Dominion and only $50,000,000 by the insured. That is, the major portion of our living would be paid to us by the State and we would be *de facto* civil servants. According to our principles we stand opposed to this. Are we prepared to stand by our principles should we be faced by this situation? Make up *your* minds! We do not know when the Dominion-Provincial Conference will be held and what may eventuate therefrom. Let us therefore, adopt as our motto, *semper paratus*.

Are there any dangers and pitfalls in this comprehensive and idealistic plan? I believe there are and that one should squarely face them.

These were set forth in a paper I wrote in 1931 and appeared in the *Canadian Medical Association Journal*, (**25:** 385, 1931). May I repeat them for they apply with equal force today in the Draft Bill of Health Insurance tending more and more, from the latest financial set up, towards State Medicine to which we are opposed.

1. A degree of discipline of public and profession alike, which, though it seem to be beneficial, would be irritating and perhaps impossible in a democratic country.

2. The probable growth of a medical or lay bureaucracy, subject to political influence, as in Germany.

3. The sacrifice by the patient who is personally paying his doctor of that independence which is a direct check on carelessness and indifference on the part of the doctor.

4. Wasteful consumption of time on the part of doctors in filling certificates, forms, etc.

5. The attempt, where payment is made to doctors at the rate of so much per visit, or so much per patient per annum, to increase a clientèle beyond the number that could be properly examined and treated. This leads to carelessness in diagnosis, too frequent visits, and "bottle doctoring" which latter is at present dying a hard death.

6. The diminution of that personal interest which doctors feel in their private patients who are directly remunerating them.

7. The fear that doctors would become only cogs in a machine controlled by the state, *e.g.* in Russia, and the fear that remuneration would not be given consistent with qualifications, attainments and experience of the doctors concerned.

With these dangers in the Draft Bill before us, have we anything to offer that willim prove the health services and minimize the dangers? May I offer some suggestions for your consideration, indicating the steps that might be taken contemporaneously or consecutively.

1. Provision for extending present welfare services, where they obtain, so as to give these groups, now partially covered, a complete service either in home or hospital, in city or in town.

2. Provision for all, of all modern preventive services by co-operation of Departments of Health, their full or part time M.O.H.'s, the practitioners and others concerned, including the public. This necessitates education of public and members of profession alike but especially the former.

3. Provision of services by the Government in those areas with scattered population and unable, ordinarily, to support a doctor—a salaried service.

4. Provision, through an obligatory contributory plan, for hospitalization of all residents in a province—a basic rate and basic service—with the option of purchasing semiprivate or private ward accommodation at their own expense.

5. Voluntary group practice, where possible, by doctors in or around a medical centre for a certain district and population.

6. Revision of our whole fee schedule with more emphasis to profession and public, as to the value, vital and monetary of non-surgical and less dramatic procedures as opposed to surgical procedures which have for too long entranced profession and public alike.

RÉSUMÉ

L'auteur offre quelques éléments de solution à trois questions: (*a*) Où en est la pratique de la médecine? (b) Peut-on améliorer le système actuel? (*c*) L'Assurance-Santé est-elle la solution idéale?

La pratique de la médecine a fait des progrès immenses depuis un demi-siècle, des progrès que le public connaît trop peu. La médecine ne doit pas et ne peut pas s'arrêter là; il lui faut toujours continuer, et pour cela, il lui faut la collaboration de tous les médecins, du public et de l'état.

Il y a plusieurs moyens à notre disposition pour améliorer les choses. Il serait bon d'envisager plus souvent les choses sous leur aspect spirituel et de considérer davantage la personnalité entière des malades que nous traitons. Il faut appliquer les principes que nous prêchons. Il faut connaître bien l'histoire de la médecine afin d'éclairer l'avenir à la lumière des erreurs du passé et du présent.

Pour ce qui a trait à l'Assurance-Santé, il semble que le projet de loi actuellement discuté à Ottawa ne réponde pas à la situation. Il faudrait que les organismes qui régiront une entreprise aussi délicate soient à l'abri de toute ingérence politique et que les désirs des diverses provinces soient, dans la mesure du possible, réalisés. Les sommes affectées au budget de l'entreprise devraient être beaucoup plus considérables. Il est impérieux d'éviter que ces remaniements socialisants ne conduisent à la médecine d'état dont les effets désastreux, nombreux et indéniables, sont énumérés et commentés.

JEAN SAUCIER

NATIONAL PROGRAM FOR MEDICAL CARE*

(An Abstract)

The objectives of a national program of medical care are enumerated as follows: 1. A national program for medical care should make available to the entire population, regardless of the financial means of the individual, the family, or the community, all essential preventive, diagnostic, and curative services.

2. Such a program should insure that the services provided be of the highest standard, and that they be rendered under conditions satisfactory both to the public and to the professions.

3. Such a program should include the constant evaluation of practices and the extension of scientific knowledge.

The report recognizes the fact that a large proportion of the population fails to receive adequate medical care either because it cannot pay the cost or because the services are not available.

Recommendations are:

1. The services.—These services should include physicians (general practitioners and specialists), hospital care, laboratory and diagnostic services, nursing care, medicine and therapeutic appliances. In addition recognized preventive services should be available to the entire population.

2. Financing.—Financing by social insurance supplemented by taxation, or by taxation alone is recommended. The financing should be on a national scale preferably with state participation.

3. Organization and administration.—(*a*) A single responsible agency is a fundamental requisite to effective administration at all levels. "The public health agencies—federal, state and local—should carry major responsibilities in administering the health services of the future." (*b*) The administrative agency should have the advice of a consultative body representative of those giving and those receiving the services. (*c*) Physicians should be paid according to the method they prefer. Attention is directed to the fact, however, that fee-for-service has a history of unsatisfactory results.

4. Physical facilities.—There should be a comprehensive survey in each area of facilities needed to provide adequate services.

5. Co-ordination and organization of official health agencies. "The activities of the multiple national, state and local agencies should be coordinated with the services provided by a national program." Increased federal and state grants for the creation of adequate public health services are needed.

6. Training and distribution of service personnel.—Funds should be available to assist qualified personnel in obtaining postgraduate education and training and to stimulate qualified personnel to practise in rural areas.

7. Education and training of administrative personnel.—Education and training should be encouraged for those who may serve as administrators of the medical care program.

8. Expansion of research.—"Increased funds should be made available to the U.S. Public Health Service and to other agencies of government (federal, state and local) for research and for grants-in-aid to non-profit institutions for the support of laboratory, clinical, and administrative studies and demonstrations." "The research agencies and those responsible for making grants-in-aid should be assisted by competent professional advisory bodies to insure the wise and efficient use of public funds."

FRANK G. PEDLEY.

*Preliminary Report on a National Program for Medical Care, Subcommittee on Medical Care of the Committee on Administrative Practice, American Public Health Assoc., *Am. J. Pub. Health*, **34**: 984, Sept., 1944.

Men and Books

CANADIAN MEDICINE AND ITS DEBT TO SCOTLAND*

By D. E. H. Cleveland, M.D.

Vancouver

There are signs by which the Scot is known abroad. They are the marks of his national genius. Its characters appear in its products: philosophers, engineers and medical men. Each of these shares certain qualities with the others. What is the doctor or engineer who has no philosophy and no imagination, and what is the philosopher with no imagination, sense of order, or eye for structure and function? No other land can produce duplicates of Hume, Carlyle, William Hamilton, John Stuart Mill, William Cullen, James Syme, Robert Louis Stevenson, James Watt or Lord Kelvin. The source of this genius is in the soil and air of Scotland. Although the one may be rocky and the other keen and harsh their fruits have been rich and given to the world with a generous hand. Scotland breeds teachers who go out to the bounds of the earth bearing the products of her spirit, and nowhere do they lack a welcome.

The ancient proverbial expression spoke of "*perfervidum ingenium Scotorum*" and the ardent spirit of the Scots which is manifest everywhere is more than a colour and a flavour. It fires the determination to see things through to their origins, to sift out their nature by analytical methods, to work out through logical progressions and to assemble the whole in metaphysical harmony. In all this there is a never-failing tenacity of purpose. Here is the Scottish genius. Even though some of its by-products may be a rigid dogmatism or pessimistic determinism, or what Emerson in one of his ill-natured assaults on Scottish traits called "the insanity of dialectics", these are but fragments from the brittle edges of virtues.

As we examine the life and work of such men as William Cullen and his great successors in the early Edinburgh Medical School, and Andrew Holmes who brought its tradition to McGill, we find flowing in them this same sap which always leads to the blossoming of naturalists, surgeons, teachers and practical thinkers in men of Scottish lineage or training.

It was at the comparatively young school of Edinburgh that the modern conception of medical education first developed and flourished. Early in the eighteenth century a generation of great teachers and investigators grew up at Edinburgh led by William Cullen. He was a born teacher who enjoyed equally great popularity with the public and his students. He had an intimate acquaintance with the Dutch and German systems and their founders. He recognized similarities of academic environment, and the spirit that animated it, in those countries and in Edinburgh. This had much to do with the development in his mind of new ideas of medical teaching such as were soon introduced in Edinburgh. It was the excellence of Cullen's teaching that first made Edinburgh popular. This was maintained by his successor, James Gregory and his still more popular nephew, William Pulteney Alison. The academic atmosphere of Edinburgh was much more conducive to the rapid development of new ideas than that to be found anywhere in London.

As an instance of what is meant by "academic atmosphere", observe that the Royal Medical Society of Edinburgh is the oldest medical society in the English-speaking world. Sir William Osler, addressing this Society in 1907 said, "it is the *men* who in the past generation have made you what you are today" and not the beauty of that fairest city of Edinburgh, the grandeur of its buildings and their historic associations, its legends and poetry. Among the members of the Society in its glorious eighteenth century were such men as Thomas Percival, upon whose medical ethics is based the Code of Ethics of the present American Medical Association; Saunders of Guy's Hospital who introduced Edinburgh methods of teaching in London; Charles Darwin, the son, nephew and grandson of Edinburgh men; the founders of the first medical school in the United States, the University of Pennsylvania; and Benjamin Rush, whose name Osler considered to be perhaps the greatest in American Medicine. So the story goes wherever we look in the history of medicine of this continent. Not long ago I dined in a magnificent building overlooking the majestic Hudson in New York, a residence for postgraduate medical students at the Columbia-Presbyterian Medical Centre. It is named Bard Hall in honour of Sam Bard, an Edinburgh man who founded King's College in New York, now Columbia University, and whose Treatise on Obstetrics was the first work on that subject published in America. It is interesting to note also that Hyde Park, the country residence of President Roosevelt, is land that was once a part of Sam Bard's Long Island estate, where he indulged the love for forestry which he had brought with him to the New World from the hills of Inverary. The founder of McGill University was a Scot from Glasgow, and the organizers of its medical school as I shall recount to you, were all Edinburgh men.

The essence of the Edinburgh method was the teaching of students at the bedside in hospitals directly connected with the medical school. Today it may seem incredible that there was a time when medical students were

*Abridged and revised from an address delivered under the same title before the Scottish Society of Vancouver, October, 1942.

not freely admitted to the hospitals. For the English-speaking world, however, this dates from 1747 when Rutherford of Edinburgh introduced his practical classes into the Royal Infirmary.

The influence of Scottish medicine appeared on the Canadian scene as the eighteenth century was entering its second half. Many Scots came to Canada after the conquest to engage in medical practice, and soon many Canadians were going to Scotland for their medical training. Such fame had the "Edinburgh method" gained in a few years that the name of Edinburgh and Scotland became almost synonymous in the medical relationships of Canada. Not a few of the men who represented Scotland and Scottish medical training in Canada are prominent not only in the medical history of Canada, but in the record of public life in Canada. Their activities were extended far beyond the bounds of medicine. Some of these we may mention.

Dr. Adam Mabane was born and received his medical education in Edinburgh. A few days after the fall of Quebec he arrived there as surgeon's mate on the hospital staff of General Amherst. He entered private practice almost immediately and rose rapidly. Within five years, so well and favourably was he known as a man of probity and sagacity, and so great was his sense of public duty that he gave up private practice to accept an appointment as Judge of the Bench. This meant a great financial sacrifice, for his salary of £150 was barely a fourth of the value of the private practice which he relinquished. He continued however to take an active interest in medicine by serving in various hospital appointments, which we may assume were then, as now, unpaid. He was a man of the highest erudition, as may be seen from the fact that when he was made a member of the Council and a Judge of Common Pleas for the district of Quebec and Montreal he perfected himself for this office by making himself master of the intricacies of French and English law. He served on Legislative Councils under later governors, and during the invasion by the Americans under Montgomery he was among those responsible for raising and organizing the Canadian militia.

Mabane died at the beginning of the last decade of the eighteenth century and six years later there were born two men, one in Cadiz and the other in Montreal, whose names are forever identified above all others with the beginnings of medical education in Canada. They were founders of the school which its most distinguished graduate has called the Edinburgh of Canada.

Andrew Fernando Holmes was born in 1797. His parents had embarked on a British vessel for Canada. It was seized by a Spanish man-of-war, and they with the rest of the passengers and crew were taken as prisoners to Cadiz. There their child was born. Upon their release they settled in Montreal where young Holmes was educated, and, after completing his apprenticeship in medicine, was licensed to practise. He went at once to Edinburgh and took his M.D. degree at the University. He also studied in London, Paris and Dublin and took the diploma of the Royal College of Surgeons of Edinburgh. In 1820 he began practice in Montreal. He was a man of enormous energy that carried his interests and activities over a wide field. He was a botanist and mineralogist and found time while in Edinburgh to collect a herbarium of the flora of its vicinity.

He also made a collection of minerals there, and you may find them today, labelled in his own hand, in the Holmes Collection of Minerals in the Redpath Museum at McGill University. In this Museum also is a collection of the entire fiora of the vicinity of Montreal, made within two years after his return there to practise. It is paradoxical but true, the busier a man is the more readily he finds time to give to his desired pursuits. Still his energies sought more outlets, so two years after he settled in Montreal he is found associated with John Stephenson teaching and laying the cornerstone of Canadian medical education. Here we must leave him for a moment and speak of his coeval friend and colleague, Stephenson.

John Stephenson was born in Montreal in 1797, and like Holmes served his apprenticeship there. He went to Edinburgh in 1817 where Holmes already was, and took his M.D. After receiving the Fellowship of the Royal College of Surgeons of London he also returned to Montreal.

Stephenson's first appointment was to the medical staff of the Montreal General Hospital, in which he acted as house-surgeon. Prior to 1819 Montreal, a city of some 20,000, was inadequately supplied with institutions for the care of the sick. The famous old Hotel Dieu which Jeanne Mance had founded a century and a half before had accommodations for but thirty patients. It did not admit "fever" patients. (Just as "fever" always means malaria in Africa and India, in early Montreal it meant typhus, which is also known as jail-fever or ship-fever.) As Montreal enlarged a group of citizens set about the task of providing for the care of poor and indigent sick on a larger scale. They established the Montreal General Hospital with 24 beds and 3 wards under a medical staff of four. Both Holmes and Stephenson were members of its first medical board. Here there strongly appeared at once the influence of Edinburgh. These two men, products of the Edinburgh Medical School, insisted, with success, that it should definitely be laid down in its charter that the Montreal General Hospital was to house a medical school, and students were to be admitted freely to its wards for clinical teaching and study as in the Edinburgh Royal Infirmary. Both men set about giving

systematic courses of medical lectures, Stephenson being responsible for instruction in anatomy and physiology.

Thus, as the result of the energetic action of Holmes and Stephenson, out of the Montreal General Hospital there grew the Montreal Medical Institute, for in 1822 they pursued their plan when they persuaded the medical officers of the Montreal General to depute the two of them to draw up a statement of the considerations which warranted the establishment of a medical school in the hospital. The remarks of the board are memorable, and the following quotation is of especial significance:

"They are further encouraged to attempt the formation of a medical seminary when they reflect that the medical school of Edinburgh, the basis of which they would adopt for the present institution, it being little more than 100 years since the medical lectures were first delivered in that city, and the early history of the Royal Infirmary of Edinburgh is not dissimilar to that of the Montreal General Hospital."

The ultimate establishment of the Montreal Medical Institute was delayed over a difficulty which arose over the matter of degrees. Since the school was not associated with any "Seminary of Learning" and had no endowment or foundation, it had no legal status, and therefore could not confer degrees. It was vainly argued that the College of Surgery of both London and Paris had similar beginnings.

About a century and a quarter ago in Montreal there existed a peculiar combination of circumstances through which the difficulty was at length overcome, and which worked out most happily for two great Canadian institutions. On one hand there was a medical school which was actively teaching but could confer no degrees, and on the other there was a University which could confer degrees but had done no teaching. Moreover the medical school had the most intimate possible relations with the wards of a general hospital and was following directly along the lines which had led Edinburgh into the position of the greatest medical school in Europe.

James McGill was a wealthy Montreal merchant, and a native of Glasgow, where he had attended the University. Like most Scotsmen he was a man of wide interests and varied activities with a lively appreciation of the value of education. In his will, drawn in 1811, he bequeathed his estate of "Burnside" with forty-six acres of land, and £10,000 in trust to the Royal Institution for the Advancement of Learning, directing that with this there should be erected on the land, a university or college which should "be named and perpetually distinguished by the appellation of McGill College". Accordingly the first unit of the University at Burnside (then in the outskirts of Montreal) was established by Royal Charter in 1821, and called McGill College. The name McGill was later applied to the whole university. McGill College had a teaching staff of five nominally appointed professors who did not teach. It was thus only a ghost of a college. Now out of the difficulties of the Montreal Medical Institute arose the proposal that members of the Institute should be appointed professors of McGill College. This permitted the Institute to confer degrees upon students completing its course, since its staff constituted the first medical faculty, actually the first teaching faculty of McGill University. Beside Holmes and Stephenson the other two members were Dr. Robertson, descended from a Perthshire family, and Dr. Caldwell who was an Ayrshire man, both also Edinburgh graduates.

McGill University then had its actual beginnings as a functioning organization in a medical school, with its first teaching faculty composed entirely of Edinburgh Medical School graduates. Until the middle of the century it was almost purely Edinburghian. Dr. Stephenson, the secretary of the Montreal Medical Institute, became the first University Registrar. While Holmes is generally called the founder of the first medical school in Canada, it is said of Stephenson that he was "the man above all others to whom we owe McGill". For to Stephenson was entrusted the successful termination of the long drawn out litigation with the McGill heirs, who had brought suit to halt the transference to the College of the £10,000 bequest of James McGill.

But the Edinburgh tradition did not find its sole repository in McGill. Strange as it may seem today, Scottish medicine has played a large and important part in the establishment of hospitals and medical schools among Canadians of French origin and speech. It would seem, looking back to those days of 150 years ago that there were much closer reciprocal relations between the two communities, in spite of diverse national origins, customs, speech and tradition, and much more merging of common interests in the new nation that they were developing than appear today. If this was true only for the medical portion of the population, that is to the credit of the doctors and the ideals which they promoted. The British were generous conquerors and the French were appreciative of the cordial spirit that animated all those who had the future of Canada as their paramount interest. This was a time when men of broad vision and sympathies were needed almost as much as they are today, and they were not far to seek among the ranks of medicine, especially those of Scottish origin or education.

The first school of medicine in Quebec was established at the Marine Hospital and from this originated Canada's two French-speaking medical schools. The Marine Hospital in Quebec was founded by a Scottish Presbyterian, Dr. Joseph Morrin, born in Dumfrieshire in 1794. He was brought to Canada as a child but returned to Edinburgh to study medicine. About

1837 medical lectures commenced at this hospital and in 1847 the Incorporated School of Medicine of Quebec came into being here. In 1852 Laval University, named in honour of the first bishop of Quebec, was instituted by a Royal Charter from Queen Victoria, and the teachers of the Incorporated School of Medicine became the medical faculty of Laval University. It would seem inevitable that at least one of the five teachers of the original staff should be an Edinburgh man. He was Dr. J. A. Sewell.

When the Quebec Medical Society was founded in 1826, Dr. Joseph Morrin was elected as its first president. Forty years later in 1867 Dr. Sewell, who at the time headed the Quebec Medical Society, presided at a meeting at Laval University to which all the medical practitioners in Canada had been summoned. At this momentous meeting was founded the Canadian Medical Association, which today is the official organization of all the practitioners of Canada. Dr. Charles Tupper, of Nova Scotia, an Edinburgh graduate, was the first president of the Canadian Medical Association; of its four vice-presidents two, Dr. Hector Peltier of Montreal and Dr. R. S. Black, were Edinburgh graduates, while a third, Dr. LeBaron Botsford of New Brunswick graduated from Glasgow.

But we have anticipated a little and must return to our French schools.

A colourful figure, identified with and responsible for much of the fame enjoyed by the Marine Hospital of Quebec, was Dr. James Douglas, the "grand old man" of his generation in Quebec. Born in Aberdeen in 1800 he went to Edinburgh at the same time as Holmes and Stephenson of McGill, and with them was a student under such great surgeons as Liston and Syme. His training at Edinburgh had followed the customary apprenticeship, and just before entering Edinburgh he had diversified the quiet life of surgeon's apprentice by a trip as surgeon in an Arctic whaler. Here he had rare opportunities for pursuing the study of comparative anatomy in a large way. He also developed his taste for adventure and seeing the world after leaving Edinburgh, for after further study at Guy's and St. Bartholomew's, he went to India to fight cholera. A little later he turned up as ship's surgeon at the Cape. He then took medical charge of a settlement in Honduras. This almost finished him, for after struggles with hardships and tropical diseases in his own person he reached Boston in 1823 nearer dead than alive. But the "perfervidum ingenium" soon burned up again and he began lecturing in surgery and anatomy at a small and impoverished medical school at Auburn, New York, even using space in his own attic for the dissecting-room. We can guess that he must have been blessed with an exceptionally affectionate and tolerant wife, for when as a result of a body-snatching episode he had to make a hurried departure, she accompanied him in the sleigh as he drove over wintry mountains to Montreal, and on to Quebec. He obtained a license to practise medicine, set up practice and soon was again giving lectures and demonstrations in anatomy. His surgical ability was considerable and his experience in the tropics was of great value in the great cholera epidemics, and the more frequent visitations of typhus. This resulted in his appointment as surgical and medical head of the Marine Hospital, and for years while he was there this hospital was considered to be the best school of practical surgery on the continent.

A few years before the incorporation of the first medical school in Quebec a group of Montreal doctors had founded l'Ecole de Médecine et Chirurgie de Montréal. These doctors, Francis Arnoldi, Francis Badgley, Pierre Munro and William McNider were all Edinburgh graduates. Dr. Munro holds a special interest for us. He was a member of a distinguished Scottish family, the Munros of Foulis, and his ancestors came to Canada in the 18th century. In 1805 Marie Munro married the last Marquis de Lotbinière, and became the great-grandmother of Dr. Louis de Lotbinière Harwood, late dean of the Faculty of l'Université de Montréal. The late Sir Henri Joly de Lotbinière was lieutenant-governor of British Columbia within our own times, and a de Lotbinière Harwood practised medicine in Vancouver until very recently. Dr. McNider lectured on obstetrics at this school and was one of the founders of the old Lying-In Hospital, now become the Montreal Maternity Hospital, one of the teaching hospitals of McGill. Dr. Hector Peltier, already mentioned, later joined l'Ecole de Médecine as professor of the Institutes of Medicine.

From the eventual union of what one may call the Edinburgh-founded Ecole de Médecine and the Montreal branch of Laval University arose the present Université de Montréal. The intimate mingling of French Catholic and Scottish Presbyterian doctors and the intricate joint evolution of the French schools and McGill in their foundations and development forms a fascinating commentary on the spirit of those times, and one upon which the imagination may profitably dwell.

The same ready exchange of ideas and sharing of interests is noticeable in the beginnings of the medical journals. These, even more than schools, are a reliable index of the state of medical activity and progress. The first medical paper in Canada was the *Journal de Médecine de Québec*. This was founded in 1826 by Dr. Xavier Tessier, and he had as co-editors Drs. Caldwell, Robertson and Stephenson, all, as we know, Edinburgh men. The Journal was published in both English and French. Twenty years later Dr. Badgley, one of the Edinburgh founders of l'Ecole de Médecine was one of the editors who founded the *Montreal Medical*

Gazette, while in the same year the *British American Journal of Medicine and Physical Science* was brought out by Dr. Archibald Hall (an Edinburgh man of course), professor of midwifery at McGill. His co-editor later replaced this Journal with the *Canadian Medical Journal* and was aided in his editorship by another Edinburgh graduate, Dr. Aaron Hart David.

Scottish nationality and teaching, predominantly of the Edinburgh flavour, entered richly into the medical endowment of other parts of Canada also. As is to be expected, many of these Scots made names for themselves as widely known in other connections as for their achievements in medicine.

In upper Canada the first medical licensing board was set up in 1819 and the senior member was Dr. James MacAulay, a native of Scotland, educated at Edinburgh. He was a prominent citizen of the town of York and took a prominent part in the early civic development of Toronto, as it came to be. In 1850, 6 of the 28 practitioners in Toronto were Edinburgh men. Toronto also can take just pride in the fact that its hospital for children established in 1878 was the first of its kind on this continent, and when 9 years later the new Hospital for Sick Children replaced it, the architect commissioned was the late John Sellers who designed the Hospital for Sick Children at Garnet Hill, Glasgow.

In Nova Scotia the influence of Edinburgh was predominant, and of 14 medical practitioners in Halifax in 1845, 13 had been trained at Edinburgh. The proposal to establish a medical school at Dalhousie in 1863 found no stronger supporter than Dr. (later Sir) Charles Tupper, an Edinburgh graduate in 1843. Tupper was a leader in many public movements. He was one of the Fathers of Confederation, being a member of the original Nova Scotia delegation to England to lay the proposals for Confederation before Crown and Government. He won the fight in the Nova Scotia legislature for the establishment of free primary and secondary schools in the Province, and the reorganization on an undenominational basis of Dalhousie. He also fought successfully Joseph Howe and his party on the issue of withdrawal from Confederation. Tupper was one of our greatest Canadians, to be remembered not as a politician but as a statesman. We are proud to remember also that he was a physician and that his education in his profession was at the hands of some of Scotland's greatest teachers. Lest the glory of his public life in Canada incline us to forget or belittle his professional ability let it be noted that when at the age of 22 he took his M.D. at Edinburgh his thesis was "The Mechanism and Management of Parturition, illustrated by a Report of 116 Cases". That he should have acquired such a rich experience at this age, all recorded by careful note-taking, is an indication of his extraordinary keenness and energy. That in the most active years of his career as Empire-builder he had not lost touch with his profession is shown by the fact that he was elected president of the Canadian Medical Association in 1867. This post has never been a sinecure, and Sir Charles took it, with all its obligations and duties, in his stride.

As we approach modern times in our medical history, there is one name to be mentioned whose association with Scottish and Canadian medicine is often overlooked. Alexander Graham Bell, whose genius was responsible for one of the most indispensable adjuncts to medical practice, although there are times and seasons when this statement might be challenged by many a practitioner gladly consigning it and its inventor to perdition, was a native of Edinburgh and a graduate of that school. His father also was an Edinburghian and a lecturer in the University. The Bells continued their researches into the mechanics of speech and the education of deaf-mutes through three generations. Alexander Graham Bell emigrated to Canada in 1870 and later was professor of physiology, at Boston University. Later he returned to Canada to make his home in Cape Breton, where he continued his researches in various branches of science, and was generally known as a Canadian.

It was from Edinburgh, which took hold upon Listerism, as the methods of Lister were first called, earlier than Glasgow itself, that the light of his gospel went out over Europe and and across to Canada. In 1877, Dr., later Sir, Thomas Roddick, of McGill, spent some time working with Lister, and brought back his teaching and methods to the Montreal General Hospital. There they were quickly adopted with enthusiasm. As has been said by a Canadian medical historian, "The entire appearance of the operating room underwent a complete change. Where formerly was a shambles, there was now the utmost cleanliness, and the beginnings of the operating room as we now know it. The surgeon bid farewell to the old top-coat, and the snow-white gown made its appearance."

The greatest physician of modern times, Sir William Osler, well appreciated the debt of Canadian medicine to Scotland. The veneration which he felt for Edinburgh medical institutions is indicated in his address to the Royal Medical Society of Edinburgh, in which he dwelt particularly upon its relation to the profession in Canada and the United States. Some of his remarks I have already quoted. James Bovell, Osler's much-lived instructor in his pre-medical years had studied pathology at Edinburgh, and took his first doctor's degree at Glasgow. There is little doubt that Bovell's favourable impression of the teaching system in Edinburgh moved him to advise Osler to leave the Toronto School of Medicine, where he had commenced his medical studies, and change over to McGill, where Bovell knew that the Edinburgh system and traditions were

perpetuated. To McGill the Montreal General Hospital stood in the same intimate relation that the Royal Infirmary did to Edinburgh University, and the degree of freedom of McGill students in the wards was not approached in any other hospital on this continent. As late as 1902 Osler in an address before the New York Academy of Medicine said that he took as his motto a quotation from Abernethy, the great English surgeon: "The Hospital is the only proper college in which to rear a true disciple of Æsculapius". Osler is credited with aiming this remark at the conditions in most New York hospitals at this late date, into whose operating-theatres students were insinuated through side-entrances and from whose wards they were excluded.

Osler had said at one time that he "would rather hold a Chair in Edinburgh than in any school in the English-speaking world". Nevertheless, he refused the chance when it later occurred. As this incident has often been referred to, and is the subject, like other actions and observations of his, of occasional misunderstandings or misrepresentations, the circumstances may briefly be referred to. In 1900 the chair of Medicine at Edinburgh, "the blue-ribbon of British medicine", became vacant and Osler's friends, especially Professor Schäfer of Edinburgh, urged him to apply for it. But a chair at Edinburgh, as was the custom of British universities, was not offered to anyone, no matter how great their attainments; it must be applied for. The candidate was required to canvass, to solicit his acquaintance for testimonials, to sue for the favours of a lay board, even as any aspirant for the honour of being deputy sheriff in a small American backwoods county, or as Coriolanus was required to do before the Roman tribunes. With less than the old Roman's brusqueness and asperity but no less resolution Osler expressed his distaste for such a procedure. He wrote to his friend Schäfer, "If offered the chair I will take it; but I cannot go into a canvass which should be most repulsive to me".

Osler had no need to publish himself or push his stock, even had he not been the least vainglorious of men; his quality and abilities were known in Europe and America to all the medical profession. Edinburgh would have been honoured by his acceptance of the chair had its board remembered that "nice customs courtesy to great kings". Finally overcome by the protestations of his friends, he yielded, and agreed to submit his application and testimonials. But when it became known in Baltimore, and the news spread beyond its confines, that the dean of the Johns Hopkins Medical School was contemplating leaving, there was such an outcry from laity and profession alike that he reconsidered his decision and withdrew his application. Four years later he received the call to Oxford. The Regius professorship was a Crown appointment with no terms to which he had to bow and doff his cap solicitously, and he accepted it. He referred again to the Edinburgh episode in 1915 when he wrote, "The most venomous system of election to professorships, still perpetuated in Scotch universities, as the candidates seek testimonials far and near . . . was entirely in the hands of the Town Council."

Canada owes much to Scotland. What country in the world is not her debtor in some respect? The debts have been contracted for many commodities: Philosophers and logicians, historians, engineers, statesmen and men concerned with great national affairs, soldiers, physicians and surgeons. It is submitted that of the material factors in the advancement of human welfare and happiness Scotland has made her greatest contribution through the channel of medical education. And when you think about it you must see that all the qualities which we recognize as characteristically Scottish, the "perfervidum ingenium", the analytical habit of mind, the tenacity, the courage, the hardiness that rejoices in making the most of little, the constructive trends in philosophy, all these are nowhere so essential as in the mixture which we call the man of medicine. Then nothing seems more natural than to find in every medical institution or community of people a large proportion of doctors of Scottish origin or training, most of them in the major rôles.

In conclusion let me quote what appears to me to be a key to the secret of Scottish national genius, from the remarks of the late Sir James Barrie in his rectorial address at St. Andrews: "Mighty are the Universities of Scotland, and they will prevail. But even in your highest exultations never forget that they are not four, but five. The greatest of them is the poor, proud homes you come out of, which said so long ago: 'There shall be education in this land.' "

Without giving a detailed bibliography I would like to acknowledge my indebtedness to the writings of Dr. Maude Abbott, J. J. Heagerty and W. B. Howell. Many of my friends have also kindly directed me to various sources for material.

After twenty years' imprisonment in a test-tube at a temperature of 50 degrees Fahrenheit, the *Bacillus pestis* emerged alive and as deadly as ever, the United States Public Health Service reports. In 1922, this agent of the plague was isolated from a California ground squirrel and subsequently passed through guinea-pigs. From the guinea-pig cultures, one series of tubes was prepared in 1923 in which the bacillus was isolated, and a similar series set up in 1924. Showing no loss of strength as a result of the two decades of confinement, the plague germ, when released from the 1923 series and injected into guinea-pigs, promptly infected them.—*The Diplomate.*

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The General Secretary's Page

May I take this opportunity of wishing every one of our 9,043 members a Happy New Year. Especially do we send most cordial greetings to our colleagues in military service wherever they are. May 1945 be for you a year crowned with victory and a happy home coming.

Speaking of members, the Association has strengthened its position very materially in the past few years. Let me here quote some figures which appeared in the report of the Executive Committee in the last issue of the *Journal*.

Paid members	5,464
Members in military service, (no fees)	3,579
Total membership	9,043
Paid membership in 1939	4,001
Total membership gain during 5 war years	5,042

It will be observed that, during the war period, we have more than doubled our membership. It is a fact that many of our members are in military service and are not called upon to pay fees. On the other hand our records disclose that our paid membership in 1944 is 1,463 more than in 1939.

World War No. 1 very nearly wrecked the Canadian Medical Association. The early post-war period disclosed a small membership with a debit balance in the neighbourhood of $14,000. Many feared that World War No. 2 might have a similar effect. Happily, such has not been the case.

Because of the war, it was decided to cancel our scientific meeting in Montreal in 1943. Upon careful consideration a year later, it was felt that it would be in the national interest and helpful to Canada's war effort that we hold a scientific meeting in 1944. Accordingly, our seventy-fifth annual meeting was held in Toronto in May last with a registered attendance of 1,706, this attendance being eclipsed only once, when the British Medical Association met with us in Winnipeg in 1930. The Toronto meeting was an outstanding success. It was abundantly clear that the medical profession was most anxious to take advantage of a scientific program and, indeed, felt the need of it. The program particularly emphasized many phases of war medicine.

It has been decided to hold a full scale medical convention in Montreal in June, 1945. The complete facilities of the Mount Royal Hotel have been secured and the program committees under the direction of Dr. Léon Gérin-Lajoie and Dr. Duncan Graham are busily engaged in preparing a program which will no doubt attract a large attendance.

In the field of medical economics, health insurance continues to engage our attention. The Social Security Committee finally reported the federal draft bill to the House of Commons omitting the financial clauses. It had been proposed that a Dominion-Provincial Conference be held in the autumn of 1944, for the purpose of discussing the Bill in detail but for various reasons the conference was not held. Our members everywhere are asking the question,—How near are we to the passing and the implementation of health insurance legislation? Your General Secretary is no prophet and has no inside information, but, with only one short session before election remaining to the present federal parliament, it would seem unlikely that health insurance legislation would be enacted prior to dissolution. Some observers are of the opinion, however, that the Government in power might pass the bill before going to the country, believing it to be a measure so widely desired that political gain would result. Other observers hold that a bill of this character calling for an expenditure of at least $250,000,000 a year, would not be thrust upon the Canadian public before they have had an opportunity to express their views once again at the polls. From the point of view of the Association, our task is quite clear, namely, to continue to inform ourselves and the public on the full meaning of healt insurance in order that when and if legislation does come, the best interests of the public and the medical profession will be served.

The Association continues to play its part i the Canadian war effort through the Canadian Medical Procurement and Assignment Board. At the present time, more than four thousand Canadian doctors are enlisted in His Majesty's services, nearly 50% of whom have graduated since the war began. The C.M.P.A.B. has been recognized by the Veterans Affairs Department as its advisers in rehabilitation of the medical profession. The Board has undertaken a complete survey of postgraduate facilities in Canada and, with this in view, has enlarged its personnel to include representatives from the Medical Schools of Canada, the Canadian Hospital Council and the Royal College of Physicians and Surgeons of Canada. Through the nine Divisions of the Association, surveys have been conducted and are being kept up to date showing exactly the need for medical practitioners throughout the length and breadth of the land. It is our hope that, when demobilization takes place and our colleagues return to civil life, such educational opportunities as they desire and such help as they may reasonably expect in reference to securing locations will be available to them in a measure which will give satisfaction to all concerned.

Divisions of the Association

New Brunswick

At the fall meeting of the New Brunswick Medical Society Executive Committee plans were begun for the 1945 Annual Meeting of the New Brunswick Division of the Canadian Medical Association at Edmundston to be held the Tuesday and Wednesday in October preceding the Medical Refresher course at Dalhousie Medical School, Halifax. This is part of the sequence of meetings of the Maritime Medical Societies.

Special Committees were advised by the Executive of the New Brunswick Division to handle all matters of rehabilitation and placement of medical officers of New Brunswick on their discharge from the armed forces.

Quebec

FINAL PROGRAM

The Quebec Division of the Canadian Medical Association will hold its annual meeting in Montreal, in January, 1945.

The meeting is to extend over two full days, beginning on Friday, January 26, and continuing on Saturday, January 27.

All members of the profession in the Province of Quebec are cordially invited to be present.

In these two days a varied program is to be presented. This will take the form of clinical presentations at both French and English hospitals in the mornings, and papers and discussions on important topics, in both languages, in the afternoons.

The program is as follows:

MORNING SESSIONS

Friday, January 26,—Hôtel-Dieu

9.00-12.30 a.m.—Medicine.—A series of interesting cases will be demonstrated, and treatment will be dealt with.

The Montreal General Hospital

9.00-12.30 a.m.—Surgery.—A number of selected cases will be shown and methods of treatment discussed.

Both the Hôtel-Dieu and the Montreal General Hospital have kindly offered to provide buffet luncheons for members of the conference.

Saturday, January 27,—Notre Dame Hospital

9.00-12.30 a.m.—Surgery.—Surgical cases of special interest will be brought forward for demonstration and discussion.

Royal Victoria Hospital

9.00-12.30 a.m.—Medicine.—Selected medical cases in the wards will be shown and discussed.

Both Notre Dame Hospital and the Royal Victoria Hospital have kindly offered to provide buffet luncheons at the close of the morning session.

AFTERNOON SESSIONS

These will be held in the Engineering Institute, 2050 Mansfield Street.

On Friday there will be a series of five papers on medical, surgical, obstetrical, gynæcological and pædiatric subjects.

On Saturday afternoon there will be a discussion on various aspects of Health Insurance, in which four speakers will take part. These will be: Dr. Antonio Pager, of St. Hermas, Que.; Dr. Murray Stalker, of Ormstown, Que.; Dr. A. M. Cholette, of Montreal, and Dr. Harris McPhedran, President of the Canadian Medical Association, Toronto.

The papers will be read in the mother tongue of the speaker, and short translations will be circulated in the audience.

Full opportunity for questions and answers will be provided.

Medical Societies

District No. 4

The annual meeting of District No. 4 Medical Association was held in Kelowna on Thursday, October 26, at the Royal Anne Hotel. Dr. L. A. C. Panton, President, presided over the sessions, and was ably assisted by Dr. W. F. Anderson, Secretary. Dr. Gordon O. Matthews and Dr. D. Murray Meekison, both of Vancouver, gave scientific papers, the former dealing with pædiatrics and the latter orthopædic surgery.

The elections placed the following in office:—*President*—Dr. R. W. Irving, Kamloops; *Vice-President*—Dr. J. R. Parmley, Penticton; *Secretary-Treasurer*—Dr. C. J. M. Willoughby, Kamloops.

Saint John Medical Society

The monthly meeting of the Saint John Medical Society took the form of a complimentary dinner to Commander Corydon M. Wassell, U.S.N., the hero of the Java evacuation and holder of the U.S. Navy Cross and the original of the character depicted lately in a current moving picture. Commander Wassell

relaxed with his medical friends and discussed various advances in the treatment of malaria and louse-carried diseases. A most splendid evening was spent by a very large gathering. Dr. E. A. Petrie was chairman.

Saskatoon and District

A meeting of the Saskatoon and District Medical Society was held on December 5, 1944.

Dr. Thomson, president of the University of Saskatchewan, and Dr. W. S. Lindsay, of the University of Saskatchewan staff, addressed the meeting on the proposed medical college and University hospital in Saskatchewan. Both speakers pointed out the necessity of a medical college and University hospital in the Province as other provinces are unwilling to take Saskatchewan students in their medical colleges, because their capacities are limited. They pointed out the many difficulties and problems that would have to be overcome and solved in establishing the new institutions.

A discussion of the above subject by Doctors Hames, Holmes, and McConnell followed.

The motion was passed unanimously. The S.D.M.S. goes on record as endorsing the principle of a complete medical school and University hospital.

La société médicale des hôpitaux universitaires de Québec

Une séance de cette société eut lieu à l'Hôpital du Saint-Sacrement, Québec, le 3 nov. Suivant les résumés des travaux présentés.

ETUDE CLINIQUE DES PANCRÉATITES AIGUËS.—W. Caron.

Vingt cas de pancréatites aiguës survenues au cours des dix-huit dernières années sont présentés. Parmi ces cas, il y eut quinze pancréatites œdémateuses, quatre pancréatites aiguës hémorragiques et un cas d'abcès du pancréas Une étude est faite des symptômes et des examens de laboratoire.

La diastase sanguine est à l'heure actuelle l'épreuve de laboratoire la plus utile pour nous aider à faire un diagnostic précis. Cette épreuve fut faite dans tous les cas présentés et, à plusieurs reprises, ce fut le plus grand élément de diagnostic. Il fut évident par des diastases faites en série que celle-ci est transitoire et n'est élevée qu'au cours des phénomènes aigus, elle baisse très vite lorsque les signes aigus récèdent.

Les antécédents d'origine biliaire comme facteur étiologique ont été mis en évidence dans un très grand pourcentage de notre série.

Enfin des statistiques nous montrent que le traitement médical combiné à la chirurgie complémentaire est la voie qui a donné les meilleurs résultats.

PÉRICARDITES AIGUËS.—R. Lemieux et H. Nadeau.

Deux cas de péricardite aiguë avec épanchement sont presenté. Dans le premier cas la péricardite résiste au traitement sulfamidé intensif; elle cède très rapidement au traitement salicylé. Ce malade est porteur d'une épidydimite chronique de nature tuberculeuse probable; l'examen radiologique des poumons laisse voir une image granulique uniforme des deux plages pulmonaires. La recherche en série des B.K. dans les crachats et le liquide gastrique reste toujours négative. L'épreuve du traitement salicylé fait croire à une étiologie rhumatismale de la péricardite.

Dans le deuxième cas la péricardite résiste au traitement par les sulfamidés, et le salicylate de soude, elle guérit rapidement par le traitement à la pénicilline. Il semble s'agir d'une péricardite à cocci à cause de sa résolution rapide sous l'influence de la pénicilline.

Ces deux malades sont actuellement en bonne voie de guérison.

SYNDRÔME PATHOLOGIQUE DES VEINES DU FOND D'ŒIL.—H. Pichette, et L. Lefebvre.

L'importance séméiologique de la circulation du fond d'œil ne se discute plus. Les progrès réalisés à date sont dus aux recherches de Baillairt, qui s'est appliqué depuis plus de 25 ans, à mesurer la pression artérielle rétinienne.

De notre côté, nous avons étudié les modifications de la circulation veineuse de la rétine. Comme il n'y a pas d'appareil assez sensible pour mesurer la pression de la veine ventrale, nous avons recherché chez tous nos patients, la pression veineuse à la veine du pli du coude, en utilisant la technique simple de Vilaret et Descomps.

Nous avons obtenu souvent des chiffres très élevés, allant jusqu'à 30 ou 49 centimètres cubes d'eau, alors que la pression normale est de 12 ou 13 centimètres, et dans de nombreux cas, nous avons trouvé une discordance très évidente entre la pression artérielle et la pression veineuse.

Les modifications de la pression artérioso-veineuse sont en fonction des échanges cellulaires et dépendent en grande partie de la circulation de liquides de l'organisme (milieu interne): sang rouge et sang blanc; système lymphatique et système lacunaire.

La pression artérielle ou veineuse n'est que l'expression du métabolisme cellulaire. Si la contraction du cœur gauche et l'inspiration thoracique sont des facteurs importants dans le maintien de la pression artérielle et de la pression veineuse, il y a d'autres facteurs également importants, entre autres la résistance des capillaires et des veinules, laquelle résistance sera conditionnée, en grande partie, par l'état de viscosité, par la pression osmotique et par la concentration plus ou moins grande du fibrinogène et des autres substances organiques contenues dans les éléments figurés et le plasma.

Séance à l'Hôpital Laval, 17 novembre 1944, à 8.30 heures du soir.

INVERSION DES ORGANES ABDOMINAUX.—M. Samson.

R.G. âgé de 11 ans entre à l'Hôpital Laval pour une tuberculose ganglio-pulmonaire. Une radiographie prise à l'entrée nous permet de constater la présence de collections gazeuses sous l'hémi-diaphragme droit.

Un transit gastro-intestinal permet de constater que l'estomac est à droite, le foie dans l'hypocondre gauche. Le cœcum est à gauche, l'angle splénique est à droite. Il s'agit d'une inversion isolée des viscères abdominaux sans inversion des organes thoraciques.

HERNIE DIAPHRAGMATIQUE DROITE.—L. Rosseau et M. Giroux.

Observation d'une jeune fille de 22 ans présentant une tuberculose pulmonaire et intestinale. L'examen radiographique pulmonaire met en évidence une image hydro-aérique s'imprimant sur l'ombre diaphragmatique. Durant la vie de cette malade, aucun signe clinique n'a pu expliquer cette anomalie radiologique.

Un examen post-mortem a permis de constater qu'il s'agissait d'une hernie diaphragmatique droite, l'angle hépatique du gros intestin se trouvant dans la cage thoracique. Il s'agit d'un arrêt de développement congénital.

Cette hernie diaphragmatique a été bien tolorée et n'a nullement contribué à entrainer la mort chez malade.

TRAITEMENT DE LA TUBERCULOSE EXPERIMENTALE DU COBAYE PAR LA "DIASONE".—I° PRIMO-INFECTION. II° REINFECTION.—M. Giroux, M.D.

L'expérience rapportée consiste dans le traitement par la "Diasone" dérivé formaldéhyde sulfoxylate disodique de la Diaminodiphénylsulfone, de cobayes divisés en deux groupes: dans le premier, on a effectué une tuberculose de primo-infection, tandis que dans le deuxième groupe, on a réalisé une tuberculose pulmonaire de réinfection exogène.

Conclusion.—I°—La Diasone a une action inhibitrice marquée sur les formes aiguës, exsudatives de la primo-infection du cobaye.

II°—Cette action est beaucoup moins marquée sur les formes caséeuse de la tuberculose pulmonaire de réinfection.

III°—La toxicité de ce produit chimique est pratiquement nulle sur l'organisme de l'animal.

LA DIASONE DANS LA TUBERCULOSE PULMONAIRE. — R. Desmeules, L. Rousseau, M. Giroux et. P. Richard.

Les auteurs soulignent qu'il est permis de penser que certains sulfamidés pourraient influencer favorablement les phénomènes exsudatifs si fréquents pendant l'évolution de la tuberculose pulmonaire.

Trente malades furent choisis pour essai thérapeutique. 87% des patients avaient des foyers exsudatifs. 80% présentaient des signes cavitaires.

Les auteurs n'ont pas employé de témoins pendant l'essai de la diasone: il y a trop de facteurs qui interviennent pour individualiser chaque cas de tuberculose.

Les symptômes toxiques cliniques furent fréquents mais atténués pendant le traitement. Il n'en fut pas de même des troubles sanguins qui se sont montrés assez intenses. 96% des malades eurent une baisse assez marquée des globules rouges et de l'hémoglobine.

L'étude des résultats s'appuie sur les radiographies et sur la bacilloscopie. 73% des radiographies indiquent des images stationnaires ou plus étendues après l'emploi de la diasone qu'avant le début de la thérapeutique expérimentale.

Tous les malades sont demeurés bacillaires après le traitement.

La diasone s'est montrée inefficace chez 30 tuberculeux pulmonaires choisis et observés avec une rigueur telle qu'il semble assez difficile de renverser le jugement porté.

Vancouver

A special meeting of the Vancouver Medical Association was held on November 15, to hear an address by George F. Buchan, M.B., Ch.B. (Glas.), M.R.C.P., D.P.H.(Camb.) who gave a very thorough review of the British system of health insurance, especially in relation to national security. He is visiting Canada through an arrangement between the Wartime Information Board and the Minister of Information in Great Britain.

Victoria

The Victoria Medical Society held its annual meeting on October 11. The following are its officers: *President*—Dr. J. H. Moore; *Vice-President*—Dr. T. M. Jones; *Honorary Secretary*—Dr. G. B. B. Buffam; *Honorary Treasurer*—Dr. A. B. Nash.

West Kootenay

The West Kootenay Medical Association held its annual meeting in Rossland on Saturday, October 28, at the Rossland Hospital. The meeting was under the able chairmanship of Doctor E. E. Topliff, President.

The team from Vancouver included Dr. Gordon O. Matthews, Pædiatrician, and President of the British Columbia Medical Association. Dr. D. Murray Meekison, Orthopædist, Dr. H. H. Milburn, President of the College of Physicians and Surgeons, and Dr. M. W. Thomas, Executive Secretary of the College. Dr. Matthews and Dr. Meekison contributed papers of a scientific nature to the meeting, while Dr. Milburn and Dr. Thomas addressed the gathering at the banquet which followed.

The following were elected to office:—*President*—Dr. G. R. Barrett, Nelson; *Vice-President*—Dr. Arnold Francis, New Denver; *Secretary-Treasurer*—Dr. Wilfrid Laishley, Nelson.

East Kootenay

On October 29, a meeting of the East Kootenay Medical Society was held in Cranbrook.

During the afternoon scientific papers were given by Dr. Gordon O. Matthews and Dr. D. Murray Meekison, both of Vancouver. In the evening a dinner was held in the Cranbrook Hotel. The members were addressed by Doctors H. H. Milburn, M. W. Thomas, G. O. Matthews, F. M. Auld, F. W. Green and W. O. Green.

The election placed the following in office:—*President*—Dr. J. Vernon Murray, Creston; *Vice-President*—Dr. T. J. Sullivan, Cranbrook; *Secretary*—Dr. W. O. Green, Cranbrook.

Winnipeg

The regular meeting of the Winnipeg Medical Society was held in the Medical College on November 17. Hon. E. J. McMurray, K.C., addressed the meeting on "The doctor and the law", dealing especially with the liability of hospitals for the acts of their servants. Recently the British Court of Appeal had reversed the point of view expressed in the judgment of the Hillyer case, and had greatly extended the liability of hospitals.

Dr. R. O. Burrell spoke on "Peripheral vascular disease", and Dr. A. J. Fraser, medical officer of the Workmen's Compensation Board reviewed the history of workmen's compensation in Manitoba and explained the working of the present Act.

At a special meeting on November 27, George F. Buchan, M.D., F.R.C.P., D.P.H., medical officer of Health in Willesden, London, explained the views of the British Minister of Health for a national health service in Great Britain. He was introduced by Dr. Rennie R. Swan, a classmate of Dr. Buchan.

ROSS MITCHELL.

Canadian Medical War Services

MEDICAL OFFICERS APPOINTED TO THE R.C.A.M.C. — ACTIVE FORCE

NOVEMBER, 1944

(Previous sections appeared in the issues of February, March, May, July, September, November and December 1943, and in each issue for 1944 except April and September.)

SECTION XXXI

Name Address	*Date of appointment*	*Name Address*	*Date of appointment*
Belleau, L. P., Lachute, Que.	20-9-44	Morton, G. K., Montreal	2-10-44
Drulak, S., Winnipeg	18-9-44	Murray, R. G. E., Montreal	21-9-44
Duprat, G., Gravelbourg, Sask.	18-9-44	Pinard, H. E., Ottawa, Ont.	18-9-44
Gaudet, J. E., Memramcook, N.B.	18-9-44	Seelig, G. M. F., Toronto	8-9-44
Lucas, G. R. J., Fort William, Ont.	18-9-44	Vasque-Cruz, J., Montreal	17-10-44

MEDICAL OFFICERS STRUCK OFF STRENGTH OF THE R.C.A.M.C.—ACTIVE FORCE

NOVEMBER, 1944

Name Address	*Date struck off strength*	*Name Address*	*Date struck off strength*
Churchill, L. P., Shelburne, N.S.	7-11-44	Laurin, B.	3-11-44
Clement, G. H., Vancouver	5-10-44	MacNeill, R. D., Kensington, P.E.I.	9-11-44
Collins, A., Fort Erie, Ont.	27-10-44	Morgan, H. R., London, Ont.	30-9-44
Feasby, W. R., Toronto	3-11-44	Mustard, H. R., Vancouver	15-11-44
Gray, K. C., Gananoque, Ont.	10-11-44	Neelands, R. J., Kirkland Lake, Ont.	21-10-44
Hershon, H., Outremont, Que.	20-10-44	Sinclair, J. W., Timmins, Ont.	22-10-44
Hicks, W. H., Kinistino, Sask.	23-10-44	Tucker, G. N., Edmonton	4-11-44

Correspondence

The Royal College Examinations

To the Editor:

In the June and July issues of the *Journal*, there appeared two communications somewhat critical of the character of the examinations of the Canadian Royal College of Physicians and Surgeons. That of Professor Rawlinson which appeared in the June issue dealt with the Primary Examinations as presently conducted. In the next issue of the *Journal*, Dr. Shute, himself a Fellow of the College, and by examination, was stimulated by Prof. Rawlinson's letter to offer some very constructive criticisms and pointed out certain shortcomings of the Final Examination of the College.

By a rather unique coincidence, as if the authors were possessed of some power of divination, at this time the Council of the College was discussing very seriously proposals for radical changes in the character of both examinations. Under the circumstances, and until the Fellows of the College hay been consulted it was not possible to make any disclosure of the action contemplated by the College.

Now that approval has been given to the changes, it is possible to render a due but tardy acknowledgment to your two correspondents, and to utilize the opportunity this offers to draw attention to amendments made recently in the By-Laws and Regulations of the College, changes which meet almost completely the suggestions of Prof. Rawlinson and Dr. Shute.

The Primary Examination was based upon the practice of the Royal College of England. It was designed to be taken by undergraduates. It was conducted by anatomists and physiologists. In this examination, no consideration was given to the clinical application of these basic sciences. Statistics have revealed that only a small percentage of those successful in passing the Primary took the Final at a later date. On the other hand the prospect of hurdling the primary in the postgraduate period acted as a real deterrent to many promising candidates.

The College has now decided to abolish the Primary Examination as presently conducted and to embody the subjects formerly included in it, Anatomy and Physiology, together with Biochemistry and Pathology in one examination, in which the clinical application of these basic sciences to Medicine and Surgery is stressed. This examination may not be taken until five years after graduation.

The applications of all candidates for admission to Fellowship by examination are to be reviewed by a Credentials Committee. Documentary evidence must be submitted by the candidate to this Committee prior to the date

of the examination, to show that the candidate has completed satisfactorily the course of training as laid down in the Regulations of the College. Unless the Committee deems this to be satisfactory the candidate will not be permitted to take the examination. Under these conditions, it is unlikely that a candidate in surgery who has never performed an operation would be permitted to proceed to the examination.

Provision is also being made for the admission to Fellowship by examination, of specialists in a number of approved medical and surgical specialties. The special branches so far approved in the Division of Medicine are Dermatology and Syphilology, Neurology and Psychiatry, and Pædiatrics, and in the Division of Surgery, Neurosurgery, Obstetrics and Gynæcology, Orthopædic Surgery and Urology.

The examination will be on the principles and practice of medicine and surgery, respectively, with emphasis on the specialty professed by the candidate. The candidates will also be examined in the basic sciences, with emphasis on the clinical application of these sciences to the specialty.

Dr. Shute rightly draws attention to the fact that medical schools and hospitals do not always consider the higher qualifications of a Fellowship as a requirement for appointment. I am very sanguine that a few years will see a marked change in this respect. Recently, the head of an important department in one of Canada's leading universities stated that in the future he will not consider anyone for an appointment on his staff who does not hold a Fellowship diploma.

It is of course not in the province of the College to provide teaching or coaching classes. But, already, I foresee the provision by our medical schools of properly arranged and integrated courses for the benefit of candidates seeking higher qualification, either that of certification or the Fellowship diploma.

This year eleven candidates were successful in the examinations for Fellowship. There are already many inquiries, some from Medical Officers returned from overseas. The removal of the barrier of the primary examinations, as hitherto conducted, will undoubtedly influence many of the younger age groups of graduates to consider taking the examination for Fellowship. There is evident a definite conviction that the possession of higher qualification such as the Fellowship offers, will greatly enhance their chances of securing desirable university or hospital appointments.

I am quite convinced that the radical changes made by the College this year will redound to the reputation of the Canadian Royal College and will greatly increase its prestige and influence.

Undoubtedly many of the criticisms raised by Professor Rawlinson and Dr. Shute were not without justification. We are very glad that the two of them left the cadaver and cell, and the case room, respectively, to voice their opinions, and are hopeful that the changes made by the College this fall will go far to meet their objections.

F. S. PATCH,
President, Royal College of Physicians and Surgeons of Canada.

Montreal, December 6, 1944.

Special Correspondence

The London Letter

(From our own correspondent)

THE NATIONAL HEALTH SERVICE

This letter is being written more or less on the eve of the annual representative meeting of the British Medical Association when important decisions will be taken regarding the Government's proposals for a comprehensive Health Service.

The annual Panel Conference last month, afforded to some extent a trial run for many of the resolutions which will be debated by the B.M.A. It is clear that the first subject for negotiations with the Government which are to open in the new year, must be the details of administration. The profession has apparently chosen to put this right in the front and to leave what might strictly be more professional matters such as remuneration, compensation and conditions of service, for discussion later.

Another important meeting in the last few weeks has been that of the British Medical Students' Association, for however much planning and negotiations may go on, it is the coming generation of doctors who will have, in fact, to work under whatever conditions are devised. It is interesting to note that the students in the questionnaire, produced a three-to-one agreement that a complete medical service should be available to everyone free of charge although it is true that the proportion of replies was not very high. The Minister of Health himself attended and addressed the students at a public session and emphasized once again that he did not want compulsion nor the changing of doctors into civil servants.

Meanwhile, demobilization is in the air and it is becoming quite clear that no efficient Health Service can be worked until Service doctors are more generally available. The Government's plan for demobilization makes no special mention of medical officers. What in fact will happen is that the arrangements for the recruitment of medical practitioners will be reversed for the purpose of demobilization, and actually it is recommended that a continued recruitment of younger doctors should, in fact, continue.

Whatever may be the outcome, therefore, of negotiations, and however soon the Government brings in its Bill to set up a comprehensive Health Service, it must be several years before even the beginnings of working out can really be made practically possible.

DENTAL SERVICE

Early last year a special committee was established to consider the question of dentistry, and in an interim report various proposals are made for a comprehensive dental service broadly analogous to the Health Service. The committee concludes that the dental health of the population is bad and its effect on general health, also bad. The figures given for the dental treatment required among recruits, are just appalling; and, in fact, not only must there be a larger dental service available but the public must be taught to demand more treatment. Many commentators have, in fact, thought that public apathy rather than shortage of dentists, is the cause of the deplorable situation.

ACADEMIC DEVELOPMENTS

The new department of Child Health of the University of Liverpool has now been opened, and developments on other university centres are being talked about. Meanwhile, in another field, the Nuffield Foundation has made a handsome allocation to assist the Universities of Durham, Glasgow and Manchester to develop departments in Industrial Medicine. At Manchester, it is proposed to create a Chair of Industrial Health, and every encouragement is being given to improve conditions for teaching and research in this subject.

CHANGES AT *The Lancet*

The proprietors of *The Lancet* have announced that Dr. Egbert Morland has now retired and has been succeeded as editor by Dr. T. F. Fox. Perhaps only those who are themselves concerned in medical journalism can quite appreciate what Morland's example and hard work in the past 30 years have really meant. When he became editor, he took over a journal which had already a high standard. But somehow, Morland has been able to gild the lily, and it is fair to say that today *The Lancet* covers a broader field and touches more closely on every-day problems than ever before.

ALAN MONCRIEFF.

London, December, 1944.

Too much heat and not enough light has been turned on socialized medicine. It is my belief we can have a national health program fitted to the nation's needs and the social and economic problems of the 48 States not entirely with socialized medicine but with more private medical practice than we now have.—Surg.-Gen. Thomas Parran.

Miscellany

SOCIAL MEDICINE AT OXFORD

By Surgeon Commander J. L. Little, R.C.N.V.R.

The extent to which man's living habits and social environment can be considered as fundamental causes of diseases and disability is being investigated by Professor John Ryle and his co-workers in the Institute of Social Medicine at the University of Oxford. This is by no means the first time that medical science has been directed to the importance of social distress as a cause of illness. Chadwick's work during the last century produced a deep impression upon the minds of all thoughtful men in the profession. Happily or unhappily, just when interest had been sufficiently aroused to promote action, the best minds of the day were attracted into the dramatic field of bacteriological discovery. The search for new micro-organisms as the specific causative agents of disease carried the field. The more intimate study of the procatarctic or predisposing causes of illness was destined to bide its time for fuller development until the new path in medical progress had been explored to its limits.

At the turn of the century progressive clinicians suddenly became clinical pathologists. Each equipped himself with an endoscope, an incubator and a microscope. No longer was it necessary to visit the home of a patient to see in what environment the disease had spawned. Given a smear of exudate, a shred of tissue or a sheaf of reports and the physician would too readily produce his diagnostic verdict, suggest the likely etiology and immediate treatment.

General practitioners, who might have helped to keep things in perspective, were over-awed or persuaded by the pronouncements of their specialist colleagues. They followed the trend away from the personal practice of medicine and began to depend too slavishly upon the radiological or laboratory report. More and more the tendency has grown to rely upon bacteriology, serology and the laboratory sciences, and in the process less attention has been given to human observation and the study of the domestic and working environment in which the personality of the patient (which includes both body and mind) reacts to favourable or unfavourable circumstances.

Health officers and social workers were compelled to take over the task of investigating the relationship between living habits and the health of individuals and communities. These workers made house-visits and accumulated case-records. They were not long in bringing forward data which could not be ignored. Their published papers were of public interest. Representatives of the people began inquiring

what action might be taken. A lively and insistent commentary reached the ears of political leaders and discussions on social insurance received an added stimulus. The ultimate effects of the health provisions in social insurance, housing and food policies may be as revolutionary in the practice of medicine as were the findings of microscopists in the days of Koch and Pasteur. The profession as a whole has viewed the developing situation with uncertainty and not always with full understanding.

Chadwick's emphasis upon community distress and illness is being revived by the growing interest in what is now called "Social Medicine". With the re-orientation of teaching, which Professor Ryle hopes to assist or direct, students at Oxford will have a wider approach to disease etiology and a growing concern for the study of health and its causes. No longer will a resident feel that he has said all there is to say about his patient when he records on the chart "Infection with Koch's bacillus". His report will be incomplete without a summary indicating that "the man is tuberculous *because* he was unemployed and had been obliged to live in an overcrowded, poorly ventilated dwelling where one of his mates had frequently spat a little blood when he coughed". The picture, thus amplified, points the way to a more intelligent treatment and understanding of "cause" and a better handling of situations. This is necessarily more complicated than simply referring the man to a sanatorium. In such a case not only is there a pathological process in certain tissues to be visualized but also a social background. There is also an extension of the sense of social responsibility in several directions as a human situation. The physician in charge would, it is true, need to be a Minister of Finance, a Minister of Supply, a Food Controller and a Minister of Health and Reconstruction if he were going to remove the fundamental causes of the patient's plight, but education and action become more realistic.

The war has excited economists to an appreciation of the cash value of healthy individuals in a community of effort. The economic aspects of health and disease have now to be considered and more closely investigated. It cannot be left to the physicians alone to deal with these vast problems which affect the rights and interest of peoples and of individuals. The new Institute of Social Medicine at Oxford and similar departments—even though their particular concern is with the developing disciplines of socio-medical teaching and research—are necessary links between the profession of medicine and the various political movements and legislative enactments aimed at the improvement of public welfare and the nation's health.

The work being carried out at Oxford is two-fold. New teaching, new investigation and interpretation of the many variables in human affairs is necessary. Social change will keep the study forever incomplete, but the work will be adapted to keep abreast of the new patterns. Several studies have already been inaugurated. Chief among these is the assessment by clinical and anthropometric methods and domestic survey of the growth, development and liability to infection of children of pre-school age in the various social groupings.

Other statistical studies are being conducted on factory absenteeism and goitre incidence in rural areas in its relation to social conditions and water-iodine levels.

Teaching in the medical school is divided between the Professor and Dr. W. T. Russell. In the first semester Professor Ryle gives fortnightly lectures on subjects of broad socio-medical interest. The titles of last session's lectures included: The Meaning of Health, The Meaning of Disease, The Objectives of Social Medicine, and Tuberculosis, Venereal Disease, and Peptic Ulcer—each considered as major social problems. These lectures are attended by students, residents, hospital social workers and members of the public health departments, some of whom themselves contribute to the course. Attendance at the lectures is voluntary. In the intervening weeks the time is given over to socio-medical case conferences. Either a hospital patient or an out-patient is selected and the case carefully worked up both from the clinical and sociological points of view. The Professor interviews the patients in private before the conference in order to gain co-operation and to explain the value which discussion of their personal affairs may bring to the study and understanding of their case and to after-care.

The case is presented, first by the clinical clerk or house physician and then by the social worker (or almoner) and is finally summed up by the Professor. A case of rheumatic heart disease in a child thus dealt with becomes much more than an infective episode and a lesson in physical signs. Where the patient lives, the type of home, what he eats and how the money is provided for necessities, how far he has to walk to school are all reviewed. The arrangements which can be made for convalescence, after-care and follow-up are considered by the senior almoner and medical social worker.

Dr. W. T. Russell gives a series of lectures on biometrics in the second term. The wealth of information available in the Registrar General's decennial reports and other statistical sources are drawn upon. Maternal and infant mortality, mortality in relation to social class or occupation, the epidemiology of tuberculosis and the acute infective fevers are considered.

It was a fortunate co-incidence that Lord Nuffield's benefaction and Professor Ryle's availability for the post occurred at the right time. The University of Oxford selects its thinkers with insight and caution. With his experience of clinical medicine, consultant

practice and methods of teaching in London and Cambridge and a wide experience of hospital problems in England, it was clear that the University's choice was a wise one. His interest in the natural history of disease and the social problems of the day are well known. His first student editorial written for the *Guy's Hospital Gazette* over thirty years ago was on the social obligations of medicine.

It is difficult at present to foresee how far the influence of this renewal of emphasis on the personal and social aspects of medical teaching and research practice may extend. The future of the Oxford experiment and the work of the Institute of Social Medicine there will certainly be watched with interest.

COLOUR IN HOSPITAL ROOMS

Canadian hospitals are showing greater interest in the healing value of carefully planned interior decoration, with theories on colour therapy and experiments in its use in the United States serving to guide Canada architects and hospital authorities, according to the hospital section of *Canadian Hotel Review*.

The article quotes medical authorities to point out the increased interest in the part that colour can play in making people well. "Most hospitals are swinging over to wall paints in pastel shades" says Arthur J. Swanson, superintendent at Toronto's Western Hospital. "We are aiming at making hospital rooms more homelike in appearance." Architect Charles Halliwell adds that decoration of a hospital room presents much the same problems as decoration of a home because "a person has to live in both."

Dr. S. G. Fines, superintendent at Mount Sinai, Toronto, agrees that the homelike trend "is a fundamental in modern hospital decoration," and stresses the importance of considering the washability of the decorating medium. He favours a dull finish oil paint; does not consider wallpaper practical for hospitals.

Dr. G. Harvey Agnew, secretary of the department of hospital services, Canadian Medical Association, terms colour an item of "major importance" in the psychological treatment of a patient, adding that not only can correctly chosen colours promote serenity of mind, restfulness and cheerfulness, but certain colours can be utilized to produce specific emotions and reactions on the part of the patient: "Generally speaking, colours at the blue end of the spectrum act as depressants, those at the red end excite the nervous system, greens and those about the middle spectrum are largely neutral in effect. A general rule, orthodox among interior decorators, advises the use of specific colour bases dependent upon the compass point toward which the room opens. North-facing rooms call for a colour with a warm yellow bases, coral or peach is recommended for east rooms. cool green for southern exposures and for those facing west."

Special problems connected with specific rooms and departments arise in hospital decoration. A surgical case, coming out of the anæsthetic, is said to feel more relaxed in a room of soft, greyed-down colours suggestive of sleep. An obstetrical case might be happier in a brighter environment, a room done in salmons and pinks.

"Where local anæsthetics are administered and the patient is conscious throughout an operation, some interesting design, perhaps a map, has been suggested," notes the article. "Examination rooms should be made to appear as large and as cheerful as possible. Waiting rooms are important too, and should be brightly arranged to boost the visitors' morale into high gear."

Abstracts from Current Literature

Medicine

Penicillin. Herrell, W. E. *et al.*: *J. Am. M. A.*, **125:** 1003, 1944.

The usefulness of penicillin, its limitations, diffusion, and detection, with an analysis of 150 cases in which it was employed is recorded.

Penicillin therapy should be confined to infections due to pathogens known to be susceptible to its action. No serious toxic reactions followed its use by the various routes of administration. The continuous intravenous drip method of administration of penicillin best maintains a constant level in the blood. Penicillin diffuses readily into most tissues but does not reach the spinal fluid following either the intramuscular or intravenous injection of the drug.

Of 150 patients suffering with infections owing to a variety of pathogenic bacteria, 103 were treated with the sodium salt, and 47 with the calcium salt of penicillin. The calcium salt appears to be handled more easily and is more stable. Among 28 patients suffering from bacteræmia, and most of whom had resisted sulfonamide therapy, 25 recovered and 3 died. At present 80,000 units in 24 hours appears to be the most satisfactory dosage in cases of bacteræmia.

Other bacterial infections for which the authors have used penicillin include bacterial endocarditis, severe cellulitis, postoperative wound infection, osteomyelitis (acute and chronic), gas gangrene, sulfonamide resistant gonorrhœa, actinomycosis, infections of the urinary tract, meningitis, pulmonary suppurative disease, and a small group of miscellaneous infections. The results with 107 patients could be considered satisfactory, and doubtful results or failures occurred with 44. S. R. TOWNSEND

The Action of Penicillin in Late Syphilis. Stokes, J. H. *et al.*: *J. Am. M. Ass.*, **126:** 73, 1944.

The authors make a number of tentative observations from material of 182 cases of late syphilis preponderantly neurosyphilis (122 cases) and including benign gummatous syphilis, ocular and other forms of syphilis and late congenital syphilis. The period of observation was from 8 to 214 days and a wide range of time-dosage schedules were used. The lesions of benign gummatous syphilis of skin and bones heal under a dosage of approximately 300,000 units in 12 to 46 days.

Irrespective of the system used, and in all types of syphilis, penicillin causes reductions of syphilitis reagin

titre in the blood in from 50 to 60% of late cases. The abnormal spinal fluid in neurosyphilis is improved in 74% to some degree, definitely in 33%. Previous treatment by older methods in neurosyphilis, including fever therapy, does not appear to prepare patients for superior results with penicillin.

Results obtained in improvement of symptoms in neurosyphilis and other states are outlined. The difficulties in evaluation are also discussed.

S. R. TOWNSEND

The Differential Diagnosis of Weakness and Fatigue. Allan, F. N.: *New England J. Med.*, **231**: 414, 1944.

The complaint of weakness, described as fatigue, exhaustion, loss of ambition, low vitality or weak "spells", is a common one and was studied in 300 consecutive patients at the Lahey Clinic. An organic cause was found in 61 (20%) and in 239 cases it rested upon a nervous basis.

Of the 61 cases with organic disease the cause was evident in 28 after routine history taking and examination. In 13 cases the suspected diagnosis was confirmed by laboratory and roentgenological study, and such further study was essential to the diagnosis of the remaining 20. The disease process was neurological in 16 patients (narcolepsy 8, myasthenia gravis 4, epilepsy 3 and postoperative brain tumour), infections in 13 (11 pulmonary infection, including 3 of tuberculosis, one urinary and one syphilitic infection), metabolic in 12 (8 diabetic, 4 hypothyroid), cardiac in 8, anæmia in 5, nephritis in 3, with single cases of vitamin deficiency, lung tumour, undulant fever and Hodgkin's disease.

The infrequent occurrence of anæmia, vitamin deficiency and cancer in this group is noteworthy. The diagnosis of hypothyroidism must always rest upon a more secure foundation than a low basal rate in an over-weight patient. Typical signs of myxœdema should be present and, if there is doubt of the diagnosis, a high blood cholesterol is of more value than a low metabolic rate.

In the 239 cases (80%) without organic disease the fatigue state was considered due to nervous causes divided into two groups; benign nervous conditions accounted for 189 cases and true neuroses for 44. The distinction is considered important since treatment differs. A neurosis is the result of intrinsic conditions whereas the patient with a benign nervous state is born with a constitution no different from the average but acquires nervous exhaustion because of special strain and stress, overwork, excessive worry or loss of sleep.

The diagnosis of a nervous state should be made as a result of a careful appraisal of the patient and not simply by the exclusion of organic disease. The following facts are suggestive: lack of energy on arising which improves during the day; alternation of days with and without fatigue; immediate benefit from medication with immediate return of symptoms when such medication is stopped for a single day, and when the patient has never felt well, or when the fatigue has been present for over 3 years without organic disease having been discovered.

NORMAN S. SKINNER

Surgery

The Use of Blood in the Treatment of Duodenal Fistula. Consales, P. A. and O'Connell, W. T.: *New England J. Med.*, **231**: 582, 1944.

External duodenal fistula is a rare complication of surgical interference in the right upper quadrant of the abdomen but it is becoming increasingly frequent as operations in this area become more common. The mortality rate is generally considered to be about 50% but has been reported as low as 23% in one series of 65 cases. Conservative treatment offers the best prognosis, surgery being reserved for cases in which the indications are definite. All advised methods of conservative therapy aim at removing the intestinal contents from the fistula, refeeding them to the patient, and attempts at chemical neutralization in the region of the fistulous opening, the latter method of attack usually meeting with little success.

A case is reported in which an external fistula of the duodenum followed a very difficult gall-bladder operation. All the usual methods of treatment were tried without benefit but rapid healing followed repeated packing of the fistulous opening with cotton packs, the periphery of which were soaked with freshly-drawn autogenous blood. It is felt that this procedure offers great promise as a satisfactory means of dealing with this dangerous postoperative complication.

NORMAN S. SKINNER

Gynæcology and Obstetrics

Measurement of the Cyclic Variations in the Quantity of Cervical Mucus and its Correlation with Basal Temperature. Viergiver, E. and Pommerenke, W. T.: *Am. J. Obst. & Gyn.*, **48**: 321, 1944.

The amount of cervical mucus that can be aspirated daily throughout the menstrual cycle has been measured quantitatively. About 60 mgm. or less is obtained from the end of the menstrual period to about the eighth or ninth day of the cycle. The amount then increases markedly for about 4 days. The peak of the maximum secretion varies from about 200 to 700 mgm., depending upon the individual observed. The secretion then falls abruptly to the previous level of 60 mgm. or less, and remains there throughout the rest of the cycle.

In six of seven cycles where the time relationship between the amount of cervical mucus and the basal temperature was observed, the maximum secretion preceded the rise in temperature by one to three days. In the seventh cycle, the maximum secretion and the temperature shift occurred on the same day. It is suggested that similar studies be applied to cases of otherwise unexplained sterility.

ROSS MITCHELL

Air Embolism After Vaginal Douching in Pregnancy. Forbes, G.: *Brit. M. J.*, **2**: 529, 1944.

An instance of death following vaginal douching in pregnancy which led to partial detachment of the placenta is recorded. The causes of air embolism, the mechanism of death in this condition, and the volume of air necessary to produce a fatal result are discussed.

ROSS MITCHELL

Iniencephalus. Paterson, S. J.: *J. Obst. & Gyn. Brit. Emp.*, **51**: 330, 1944.

The cause of this condition is unknown, but it is undoubtedly a developmental error occurring in the early weeks. According to Minot and others, embryos show during the 3rd week an acute lordosis of the spinal column which normally rectifies itself by the 4th week. In a discussion on Dorland's paper, Bartelmez points out that certain persons inhibit developmental as well as regenerative processes. Thus something taken by the mother in the early stages of her pregnancy with the idea of causing a miscarriage might, while failing in the mother's object, cause this inhibition.

In the 4 cases described, one or two suggestive points emerge. None of the pregnancies were first pregnancies; none of the mothers were very young; where recorded the gap between this and the immediately preceding pregnancy was not small. The fetuses were all female, and other abnormalities were present in 2 of the 4 cases. In every case, there was some abnormality of the pregnancy, such as placenta prævia, hydramnios, or hypertension.

The incidence of this type of developmental abnormality is probably not so rare as earlier writers suggest. The 4 cases described occurred in the routine hospital work of 2 years; the total number of deliveries during that time was 3,583, an incidence of 1 in 896. If the typical features of such cases were as well known as, say, the typical features of hydrocephalus, it would probably prove to be less of a rarity than the total of 57 recorded cases suggests. Adding this series to pre-

vious recorded cases the sex incidence to date is 44 female, 5 male, 12 unspecified. Hydramnios is recorded in 12 cases of a total of 61, and may have been present in more. Diaphragmatic hernia has been noted now in 12 cases and twice the diaphragm was absent. Talipes is the commonest abnormality, recorded in 18 cases of 61.

P. J. KEARNS

Orthopædics

Acute Manifestations of Yaws of Bone and Joint. Helfet, A. J.: *J. Bone & Joint Surg.*, **26:** 672, 1944.

The author describes an acute disease of bone due to yaws. It is manifested by pain, usually following trauma, with x-ray evidence of subperiosteal necrosis and deposition of new bone in onion layers or radiating spicules. Some of the cases show punched-out areas and general increase of density. Pathologically there is a lesion showing small round cell infiltration, plasma cells, perivascular cuffing with deposition of bone either in onion layers or as radiating spicules.

Some cases show multiple ganglia of the tendons and a synovitis of the adjacent joints. These all clear rapidly both roentgenographically and symptomatically after treatment with arsenic and bismuth preparations.

GUY H. FISK

March Fracture. Leavitt, D. G. and Woodward, H. W.: *J. Bone & Joint Surg.*, **26:** 733, 1944.

March Fracture. Bernstein, A. and Stone, J. R.: *J. Bone & Joint Surg.*, **26:** 743, 1944.

These two papers describe the experience of two different camps with march fracture. In all some 354 cases are analyzed and discussed in detail. The authors of the first paper consider that early diagnosis by x-ray is essential in handling these cases. No single etiological factor could be found but the condition appeared mainly after marching on hard roadways. The average patient had been in the army 7 months before he developed the disease. The fracture usually occurred in the distal portion of the third metatarsal but was also seen in fair number on cases in the second and fourth metatarsals. Treatment by absolute freedom from weight bearing gave the best results in the authors' experience but on the whole end results were not satisfactory, very few of the men being returned to their units in category A.

The authors of the second paper hold some different views on the disease. They found that it occurred after speed hikes and was seen in all types and conditions of soldiers including negroes. Their cases were treated by the insertion of a rigid bar, ½ inch wide, ⅛ inch thick and 6 inches long in the sole of the shoe to hold it rigid. After his shoe sole was made rigid in this manner the soldier continued his training and in one to two months the condition had completely disappeared in more than 90% of the cases.

GUY H. FISK

Insufficiency Fracture of the Calcaneus. Hullinger, C. W.: *J. Bone & Joint Surg.*, **26:** 751, 1944.

This is a discussion based on 102 cases of the fracture seen by the author at one of the army camps. It is seen commonly in soldiers who have a considerable amount of jumping to do in their training program. It is the result of repeated minimal traumata to the heels and resembles the march fracture of the metatarsals. There is pain on walking, with a perceptible limp. On examination there is seen to be diffuse moderate swelling of soft tissues over the medial and lateral surfaces of the calcaneus with tenderness over the under surface of the heel. On compression of the calcaneus between the fingers from side to side there is also tenderness. The x-ray shows nothing until the fifth week when an irregular sclerotic line indicating a healing fracture of cancellous bone is seen. There is no displacement of the fracture. The blood chemistry of these cases is entirely normal. The treatment found to give the best results was, rest physical therapy, and rubber heel elevations when walking was resumed. After 8 to 10 weeks the men returned to full duty. There were no recurrences.

GUY H. FISK

Otolaryngology

Cancer of the Larynx: A Radiotherapeutic Test as an Aid in Choosing Between Operation and Irradiation. Cutler, M.: *Arch. Otolaryng.*, **39:** 53, 1944.

This paper considers two clinical groups: lesions which are too advanced for laryngofissure but suitable for either laryngectomy or radiotherapy; cases in which radiotherapy is preferred to laryngectomy because of advanced age, poor life expectancy, concomitant disease or a psychological state adverse to laryngectomy.

By increasing the voltage and the filtration of roentgen rays, by using low intensity and small size of portals, one produces the maximum injury to the tumour and the minimum damage to the normal tissues.

Roentgenotherapy was used for the following reasons: (1) There was partial mobility of the structures leading to the possibility of adequate radiosensitivity for cure by irradiation. (2) The lesion was a small cell plexiform epidermoid carcinoma of the transitional cell type. (3) The patient was of an advanced age or in a poor general condition. (4) The patient requested radiotherapy as the initial procedure. No special technical difficulties were encountered at operation; only, more delay was noticed in healing of the operative wound which finally did heal satisfactorily.

The radiotherapeutic test was obtained by the interrupted method of irradiation which consists of two cycles of roentgenotherapy separated by an interval of 11 to 15 days. At the end of 21 days from the beginning of the treatment, or 15 days from the last treatment, it has been possible to judge the response and estimate the radiosensivity of the lesion with reasonable accuracy.

If the lesion has shown little or no response, the second cycle of radiotherapy is omitted and laryngectomy is performed 4 to 6 weeks later; if the response has been marked, the second cycle is administered.

A typical example is reported with the following features: The large total dose (9,600 r) was administered in only twelve treatment days with little reaction in the skin or the mucous membrane. Finally the lesion disappeared 38 days after the last treatment.

V. LATRAVERSE

Neurology and Psychiatry

Psychiatric Observations in the Tunisian Campaign. Spiegel, H. X.: *Am. J. Orthopsych.*, **14:** 381, 1944.

The author reports his experiences and impressions as an infantry battalion medical officer for 900 soldiers during four major engagements of the North African campaign including one amphibious operation. He emphasizes the unusual rigors and hardships that the men frequently have to endure as well as the specific individual problems which present themselves to the men on a battlefield. The interpersonal relationships among the men and the men and the officers become more particularly intense and important, and the drive which enables the men to attack week after week under the most trying conditions is in the author's opinion related primarily to the regard for one's comrades who share the same dangers, the respect for the platoon leader or company commander who has backed them up with everything at his command, a concern for one's reputation and that of their commander and leaders, as well as an urge to contribute to the task and success of one's particular unit. The vast majority of psychiatric casualties reported here were in the category of acute anxiety states. Conversion hysterias were few. The symptoms noted in most of the cases were a feeling of tension, dry mouth, palpitation, mild tremors, increasing sensitivity to noises of any kind and in some instances almost complete disorientation. The common factor in

all these psychiatric conditions appears to be that of fatigue or exhaustion. The author refers to what he calls the X-factor which he identifies with courage and indicates that this factor which enables men to control their fears and combat their fatigue is related primarily to good inspiring leadership. Reference is made to the fact that under certain favourable conditions even psychoneurotics and psychopaths perform well in battle under good leaders. BARUCH SILVERMAN

Military Adjustment of Former Problem Boys. Lurie, L. A. and Rosenthal, F. M.: *Am. J. Orthopsych.*, **14:** 400, 1944.

This study is concerned with the military adjustment of 116 problem boys who had at one time been under observation in a special Child Guidance Home in Cincinnati and months or years later enlisted or were drafted into the armed forces. Fifty-three of these boys had originally been treated because of anti-social behaviour such as truancy, stealing or sex delinquency. Twenty-seven had manifested various forms of nervousness. The rest of this group showed signs of academic failure and other behaviour problems. In exactly half of the cases the causative factors underlying the behaviour difficulties were primarily exogenous. In 34 cases, endogenous factors were felt to be the responsible causes. Of this number 26 constituted a group wherein feeblemindedness, organic disease of the central nervous system, psychopathic states, psychoneuroses and psychoses were the outstanding factors. The remaining 22 cases were classified as heterogeneous, in that both exogenous and endogenous causes were felt to be equally responsible and included 11 cases in which mental retardation played a leading rôle. The progress of these boys had been carefully followed over a period of years and 73 of the group had made a good social adjustment. Forty-two were badly adjusted at the time of their induction into the armed service. The present military adjustment of these boys has been surprisingly good. Of special interest is the large number who have been cited for meritorious service and the fact that 40% of this group have either received promotions, special assignments or were decorated for bravery. These findings lead the authors to question the desirability of rigorous exclusion of this type of individual from military service and to conclude that not every psychopathic or psychoneurotic individual need necessarily break down in the service.

BARUCH SILVERMAN

The Differential Diagnosis of Intraspinal Tumours and Protruded Intervertebral Discs and Their Surgical Treatment. Love, J. G.: *Neurosurg.*, **1:** 275, 1944.

If diagnostic errors are to be kept at a minimum, and if the best results are to be obtained from therapeutic efforts, the mistake should not be made of considering every intractable low back and sciatic pain as being due to protruded intervertebral disc. It should be remembered constantly that trauma may initiate the symptoms of intraspinal neoplasm just as well as those of protruded intervertebral disc. The patient who has a protruded intervertebral disc usually will give a history of trauma or of unusual stress or strain to his back, with subsequent intractable backache or sciatic pain or both. The pain is usually (in about 85% of cases) intermittent and is not relieved by ordinary measures directed to overcoming the discomfort of myositis, fibrositis, arthritis, or strains of the muscular and ligamentous structures of the back. On examination, the erector spinæ muscles are spastic and limping and listing may or may not be present. Spinal motion usually is limited and painful and the straight leg raising test is positive. Neurological signs usually are minimal and consist, in the main, of diminution or absence of the Achilles reflex, with hyperæsthesia or anæsthesia over a small segment of the surface of the skin. The concentration of total protein in the spinal fluid in two-thirds of the cases will be more than 40 mgm. per 100 c.c. but rarely more than 100 mgm. The patient who has a tumour of the spinal cord ordinarily gives a history of insidious onset of pain that gradually progressed, without intermittency, until he became more or less incapacitated by it. The physical findings frequently are scant but the neurological signs usually are definite. There may be muscular weakness, atrophy of muscles, reflex changes and definite, and often extensive, sensory changes. In many cases, roentgenological examination of the spinal column will reveal bony changes indicative of intraspinal pressure. Some of these changes consist in erosion of the vertebral bodies, enlargement of the intervertebral foramina (especially in the presence of dumbbell neurofibromas) and erosion of the pedicles of the vertebræ. On spinal puncture the fluid often is xanthochromic and practically always contains more than 40 mgm. per 100 c.c. of protein. Frequently a subarachnoid block is demonstrable by Queckenstedt's test if the needle is below the level of the tumour.

In an analysis of the records of 26 cases of tumour of the spinal canal, in which symptoms of root pain suggested irritation or compression of the spinal cord, or nerve roots by a protruded intervertebral disc, it was found that diagnostic spinal puncture, with or without visualization of the spinal canal, was essential to diagnosis and to localization of the intraspinal lesion. Of a series of 15 cases of tumour of the spinal canal, it was found that in 8 the symptoms were misleading in that they suggested protruded intervertebral disc. Also, during the period when this series of 15 patients came to operation, 100 other patients were subjected to operation for protruded intervertebral discs. Therefore, in any case of unexplained, intractable, root pain and in almost every case in which protruded intervertebral disc is suspected, diagnostic lumbar puncture should be performed and the protein content of the cerebrospinal fluid should be determined. A value for spinal protein of more than 100 mgm. per 100 c.c. usually means a neoplasm rather than a protruded intervertebral disc. One should not await definite neurological signs before making the diagnosis. FRANK TURNBULL

Dermatology

Epidermolysis Bullosa. Mooney, J. L.: *Arch. Dermat. & Syph.*, **50:** 167, 1944.

The author gives an account of four men who had to be discharged from the armed services because of the presence of epidermolysis bullosa. In each instance the eruption and blistering on the hands and feet had been erroneously diagnosed, and it was not until a complete examination and a full family history had been taken that the correct diagnosis was made.

All four patients gave a history of blisters arising on their feet from prolonged standing or walking, and on their hands from merely rubbing the palms together. Two of the men were discharged from the service, the other two are awaiting further disposition. In one instance the man stated that his mother and grandmother had been similarly affected, in another instance, that the only other person in the family similarly affected was his grandfather, and in the third case the man gave quite an extensive family history of the condition — his great grandfather, his grandfather, his father, two of his three sisters and some of their children, and two of his own three sons were affected with this disease; his two brothers were normal.

This condition regarded as rare was found four times in 1,000 dermatological consultations. Its importance in men in the armed services is quite evident.

MADGE THURLOW MACKLIN

Therapeutics

The Treatment of Early Syphilis with Penicillin. Moore, J. E. *et al.*: *J. Am. M. Ass.*, **126:** 67, 1944.

Some of the preliminary results of an organized study of the effect of penicillin in early syphilis are presented. Penicillin has a profound immediate effect in early syphilis in terms of (*a*) disappearance of surface organisms from open lesions; (*b*) healing of lesions, and (*c*) a trend toward serological reversal.

Various dosages have been used but the immediate effects cannot be utilized to determine the optimum time-dose relationship, which, in man, depends on the incidence of relapse. The incidence of relapse, when penicillin is administered alone, is in direct relationship to the total dosage given by the intramuscular route in a seven and one-half day period, greatest with 60,000 units and least with 1,200,000 units! Relapse appears to be more frequent after intravenous than after intramuscular administration of comparable doses. Penicillin has a favourable effect in early asymptomatic neurosyphilis, acute syphilitic meningitis, early syphilis treatment resistant to arsenic and bismuth, and infantile congenital syphilis.

The minimum dose, especially in secondary syphilis, should not be less than 1,200,000 units, and probably it should be more. S. R. TOWNSEND

Hygiene and Public Health

Hepatitis After Yellow Fever Inoculation, Relation to Infective Hepatitis. Findlay, G. M., Martin, N. H. and Mitchell, J. B.: *The Lancet*, **2**: 301 and 340, 1944.

These two papers deal with the clinical and pathological findings of 689 persons who developed jaundice following inoculation with yellow fever virus suspended in human serum. The authors refer to a previous report of some 28,585 cases of jaundice in the armed forces of the United States also assumed to be due to yellow fever inoculation. Reference is also made to other outbreaks of jaundice following inoculation with measles immune serum, mumps immune serum and transfused blood, plasma or serum.

The agent responsible for the jaundice is thought to be a virus which contaminated the human serum used as a diluent of the yellow fever virus but this has not been identified. The length of the incubation period (as long as 200 days) is possibly evidence against the virus theory but does not rule it out for similar prolongation of incubation period has been recorded in cases of rabies.

The article records the clinical picture of the cases and the autopsy findings on the single fatal case.

The number of individuals inoculated with the vaccine alleged to have caused the jaundice is not known and an infectivity rate can, therefore, not be given.

FRANK G. PEDLEY

Industrial Medicine

Chronic Carbon Tetrachloride Intoxication. Stewart, A. and Witts, L. J.: *Brit. J. Indust. Med.*, **1**: 11, 1944.

This article presents findings of a detailed survey of over 170 men and women working in a chemical factory under war time conditions, where, owing to unsatisfactory ventilation, the exposure to carbon tetrachloride was heavy. During a period of 2½ years more than half of the workers had been discharged or transferred to other employment on account of symptoms attributable to carbon tetrachloride poisoning.

Seventy-eight workers were interviewed and examined. The examination in most cases included venipuncture and special investigations such as test meal, barium meal, gastroscopy and a detailed examination of the eyes by an ophthalmologist. The history in almost every case revealed symptoms resulting from exposure to carbon tetrachloride; characteristic of these were gastro-intestinal disorder and mental dullness. Details are given of gastro-intestinal effects, mental effects, hæmatological and biochemical data, barium meals, fractional gastric analysis, gastroscopic examination, examination of the eyes and follow-up of the cases.

The gastro-intestinal symptoms varied in severity with the exposure, from a mild queasiness to violent and repeated attacks of nausea, vomiting, colic and diarrhœa. Immediately following exposure to high concentrations of the vapour, temporary cerebral effects occurred, such as light-headedness, giddiness and vertigo. Evidence of hepatic or renal damage was rarely obtained; there was no evidence of visual defects and no pathognomonic change in the blood count. Investigation of the gastro-intestinal tract showed gastric hypersecretion, and hypermotility with accompanying irritability and irregular contraction throughout the alimentary tract.

Follow-up investigation showed that the symptoms, with the exception of gastro-intestinal disturbance, cleared in a few days or weeks after removal from exposure.

The authors suggest that both the mental dullness and the gastro-intestinal upset are due to an effect on the central nervous system and are explicable in terms of the narcotic action of carbon tetrachloride. They stress the need for better design of plant, better ventilation and better use of masks and suggest that when conditions of work cannot be made ideal, alternation of work, with successive weeks in and out of exposure, may improve efficiency. MARGARET H. WILTON

Weight-Lifting in Industry. Tugman, R. E.: *Occup. Psychology*, **18**: 116, 1944.

In this article the subject of weight-lifting in industry is discussed from a practical point of view by a man who is safety officer to the I.C.I. (Alkali) Ltd. Weight-lifting is responsible for a large number of accidents. To combat them demands investigation as to how and why they happen. This is a matter both for the doctor and for the safety officer. Many so-called accidents recorded by the factory department are not really accidents; they are physical disabilities of work people wrongly attributed to some part of their occupation. These disabilities can be determined only by a doctor. If an injury is not the result of such disability but has been caused by weight-lifting, then it is the responsibility of the safety officer to determine the cause. He must look for all unsatisfactory conditions such as excessive weight, bulky shape, unnecessary lift, incorrect lift, bad team-work, insufficient training and insecure stance.

The author shows how an investigation of this type should be carried out. He also considers the question of reducing the number of weight-lifting accidents by the following methods: regulating the weight and shape of the lifted object, correcting the method of lifting, training newcomers in the method most suitable for their particular tasks, ensuring security of stance by keeping floors in good condition and by use of properly constructed footwear, and medical supervision.

Special supervision is required where work involves the lifting of weights by women and young persons. The results of strain may be delayed in their appearance but the effects are cumulative. Women should not be allowed to lift weights above breast level and there should always be as little strain on the abdominal muscles as possible.

It is the author's opinion that works managements should treat each weight-lifting operation on its merits and decide from a common sense point of view what steps are necessary and practicable to protect the workers themselves from any inclination to overstrain.

MARGARET H. WILTON

Fifty-three varieties of foot ailments, from corns to cancer, are reported in the *Journal of the American Medical Association* in an 1944 issue. Included are callus, two kinds of corns, five kinds of warts, six fungous infections, twelve foot ailments due to disorders of circulation, thirteen inflammatory conditions including psoriasis, thirteen kinds of benign and malignant tumours, and some tumourlike conditions resulting from tuberculosis and syphilis.—*The Diplomate.*

Obituaries

Dr. Arthur Wallace Bagnall, of Vancouver, died on November 22 following a long illness. He was a graduate of Tufts College Medical School, Boston, of 1906.

Dr. Robert Ovens Fisher, aged 70, for 26 years a practising physician and surgeon in Toronto, died suddenly at his home, 343 Sherbourne St., Toronto, following a heart attack.

Dr. Fisher was chief medical adviser of the Canadian Mothercraft Society, to which he had devoted his services since the inception of the organization. Born in Halton County, he received his early education in Georgetown and graduated in medicine from the University of Toronto. For some years he practised in Oakville, then went to London, Eng., for postgraduate study, receiving the degrees of L.R.C.P. (London) and M.R.C.S. (England).

Dr. Fisher was a member of the Masonic Order and the Scottish Rite and the Granite Club.

His wife, the former Blossom Ann Sims, died in June, 1943. Surviving are five brothers, John F., Peter M., W. W., G. A., and T. J. Fisher, and two sisters, Mrs. Mary Lawson and Mrs. Gertrude A. Currie.

Frederick Samuel Lampson Ford, C.M.G., M.D., a native of Nova Scotia, died on November 23, 1944, in Toronto. He was 76 years old.

Prominent in military and medical circles, Col. Ford was former district medical officer for Military District No. 2.

Col. Ford served with distinction in the First Great War, mobilizing the 1st Canadian Casualty Clearing Station, of which he was the O.C. in Canada, England and France. Later in France and Belgium he became deputy assistant director of medical services, Canadian, and subsequently assistant director of medical services, 1st Canadian Div., with rank of colonel. Seriously wounded, Col. Ford was mentioned in despatches by Sir Douglas Haig and was awarded the C.M.G. He held the 1914-15 Star, the British War Medal, the Victory Medal and V.D.

Born in Milton, N.S., Col. Ford received his education at Liverpool, N.S., High School, the College of Physicians and Surgeons, University of Maryland, and in hospitals in London, Eng. From 1894-1907 he practised medicine in Nova Scotia. In 1905 he was appointed a lieutenant in the C.A.M.C.

Invalided home after the First Great War, he was appointed inspector of military hospitals in Canada for 1918-19. He held the office of district medical officer for M.D. 2 from 1919 to 1932, when he retired. He was an honorary president of the Military Institute, a member of the Academy of Medicine and especially active in the library and historical section, the Æsculapian and R.C.Y. Clubs. He was unmarried.

It is reported that the residue of his estate will be divided between the Masonic Home at Windsor, and the Dawson Memorial Hospital, Bridgewater, N.S.

An Appreciation

In the passing of Colonel Frederick Samuel Lampson Ford, C.M.G., V.D., Canada and Canadian Medicine have suffered a well-nigh irreparable loss, the loss of a citizen, an officer and a gentleman of so fine a type as not to be easily replaced. His name is "writ large" in the annals of the Canadian Army Medical Corps during Chapter I of the Great War, in those of the preceding and succeeding periods of its history, and in those of the period during which this Dominion grew to its present status as a nation of the Commonwealth.

Colonel Ford was a native Nova Scotian; his forebears had come to America with the *Mayflower*. He graduated in Medicine from the University of Maryland in 1894. He practised medicine in his native province and, in 1905, took a commission in the then newly organized Canadian Army Medical Corps. Upon the outbreak of war in August, 1914, he commanded, and took overseas in September, 1914, No. 1 Casualty Clearing Station of the First Division, C.E.F. In March of 1915, he and his unit were in France. Almost at once came the battle of Neuve Chapelle, succeeded in April by the first battle of Ypres with its murderous gas attack. For the outstanding services of himself and his unit in these engagements, he was awarded a C.M.G. In 1916 he was appointed Deputy Assistant Director of Medical Services at Canadian Headquarters in France. In 1917 he was so seriously wounded that he was later evacuated to Canada, where, during 1918 and 1919 he served as Inspector of Hospitals. His distinguished services while in France brought him, in addition to his C.M.G., a mention in the dispatches of Sir Douglas Haig.

From 1919 until 1932 he served as District Medical Officer of Canada's largest and most important military district, M.D. No. 2. Since 1932 he had been on the retired list of the Royal Canadian Army Medical Corps, having served it and his country and Empire with unusual success and distinction for nearly 30 years. His keen interest was maintained to the end.

Nor did his interest in his chosen profession ever flag. He was a member of the Toronto Academy of Medicine, and a frequent contributor to its deliberations. His particular interest was the history of Medicine, and one of his major contributions to that fascinating subject was a brochure entitled, "William Dunlop, 1792-1848", dealing with the life and times of that pioneer of Canadian Medicine.

To have served with Colonel Ford was a rare privilege; to have known him and his fine philosophy of living was to enjoy an inestimable advantage. His stimulating idealism, his loyalty to his high ideals, his balanced judgment, his wise counsel and his splendid example gave immeasurable support to his many friends and associates, who, like himself, dared to be outspokenly patriotic and to burn what incense they might on the loyalty to Sovereign, Empire and native land at a time when such attributes seemed more and more to be discounted. He held in scorn those whose utterances seemed to border on what he termed "veiled treason". He belonged to that group of Canadians who see no incompatibility between loyalty to the Empire and loyalty to native land; to whom the two loyalties are one. His loyalty was absolute. His fine mind, his idealistic philosophy and his cultured personality, in moulding the thought, heightening the ideals and crystallizing the loyalty of those who came under his influence, made an incalculable contribution to the life of his times in this Dominion. Without such men as Colonel Ford, its future as an integral part of the Commonwealth and Empire would not have been so full of promise.

The basis of his philosophy of living was an abounding faith in God. In bringing to a close one of his last addresses, delivered to a group of his friends and admirers, assembled to do him honour, he said:

"The note I would sound, and the word I would leave with you tonight is, 'Be strong, quit yourselves like men and fight'. That is the spirit which will win the war and save your souls alive. For 'Unless the Lord' (and here the name of the Deity connotes that divine spark in the breast of every good man), 'Unless the Lord keep the city, the watchman waketh but in vain' ".

His memory will long remain. The influence of his devoted life of service will persist. In the words of his comrade-in-arms, the immortal author of "Flanders Fields":

"God meteth him not less but rather more,
Because he sowed and others reaped his store."

WILLIAM J. DEADMAN

Dr. James Gray, of Seaforth, Ont., died on November 10, 1944, in his 91st year.

Dr. John B. Gullen, aged 89, one of the founders of the Toronto Western Hospital, died on November 27,

1944, at his home, 461 Spadina Ave., Toronto. His wife, Dr. Augusta Stowe Gullen, the first woman physician to graduate in Canada, died in September, 1943.

Dr. Gullen had been in ill health for the last 18 months. A son of Judge R. G. Gullen, he was born at Leeds, Que. He attended Woodstock Baptist College and the University of Toronto.

A graduate in medicine from Trinity College in May, 1883, he was married a week later to Dr. Augusta Stowe, a pioneer among medical women in Canada. Together they took postgraduate work in New York, studying children's diseases. Together they saw many years of service as general practitioners. In May, 1943, Dr. J. B. and Dr. Augusta Stowe Gullen, the first two Canadian doctors to be united in marriage, observed a dual diamond anniversary—the anniversary of their graduation and of their marriage.

Dr. Gullen was for 25 years treasurer of the Toronto Western Hospital and a member of the board of governors. He lectured on children's diseases at the former Ontario Women's Medical College, and was a life member of the Toronto Academy of Medicine. He was a member of the Empire Club, Scarboro Golf Club, and the Muskoka Lakes Golf and Country Club.

Surviving are two sisters, Mrs. Charlotte Hicks, Vanscoy, Sask., and Mrs. Alice Toland, Jerseyville, Ont. Magistrate F. C. Gullen is a nephew.

Dr. Anthony R. Hanks, of Blenheim, Ont., died on November 10, 1944. He was a graduate of Trinity University 1885. He is survived by two daughters, Mrs. H. G. Watson, of Blenheim and Mrs. C. B. Whyte, of Hamilton.

Dr. George Alexander Hassard, Essex County coroner for many years, died on November 13, 1944, at Windsor, Ont., after a lengthy illness. Born in Sturton, Ont., the son of the Rev. and Mrs. R. R. Hassard he attended Uxbridge High School, and his medical degree he obtained from the University of Toronto in 1897. He is survived by his widow, one daughter, Mrs. H. J. Kennedy, of Windsor, and a son Lieut. R. R. Hassard, of Brockville. A sister, Mrs. A. J. Irwin, of Toronto, and two brothers, Dr. R. E. Hassard, of Los Angeles and Harry C. Hassard, of Tilbury, also survive him.

Dr. John A. Hislop for more than 40 years a practising physician at Edmonton, died at Winnipeg on October 18, 1944. He was a graduate of the University of Manitoba 1900. He is survived by three children, all of whom are in the Canadian armed forces. Lieut. Richard Hislop, Royal Canadian Engineers; Section Officer Inga Hislop, R.C.A.F. and Corpl. F. C. Hislop who is serving overseas. A sister Mrs. W. J. Brown also survives him.

Dr. Basil North MacAulay who was in his 59th year died on October 28, 1944, at Dunnville, Ont. He graduated in medicine in 1910 from the University of Toronto. He is survived by his widow and two daughters, Mrs. Ross Robert, Long Beach, Cal., and Mrs. D. Garbutt, of Dunnville.

Gordon Alexander McCurdy. Many friends in Nova Scotia will learn with regret of the death in Victoria, B.C., of Dr. McCurdy. He was a graduate of Dalhousie University in 1925 and for some years was pathologist in the Department of Public Health and lecturer in pathology in the University.

Dr. Albert A. Macdonald, aged 93, died at his home on November 11, 1944. Son of the late Judge Archibald Macdonald, he attended school in Guelph, took his M.B. degree at the University of Toronto in 1872, his M.D. degree in 1888 and, following postgraduate work in London and Edinburgh, received the degree of L.R.C.P. and S. He commenced practice in Guelph and was one of the first medical men in Canada to use the antiseptic methods developed by Lord Lister under whom Dr. Macdonald studied. In 1878 he moved to Toronto.

He was president of the Ontario Medical Council in 1905, was one of the founders of the Academy of Medicine and was president in 1910. He was one of the founders of the Toronto Western Hospital and was a member of the board of governors. He was also one of the founders of the Æsculapian Club. In 1913 he was appointed associate professor of gynæcology at the University of Toronto.

In 1937 he retired as vice-president of the National Life Assurance Co. of Canada, whose medical service he directed from its earliest years.

He was a member of St. George's Anglican Church since 1878. In 1871 he was a member of the first Wimbledon rifle team from Ontario, the forerunner of the present Bisley team. He was a life member of the Royal Canadian Yacht Club, was commodore from 1906-8 and was an active sailor for nearly half a century. His wife, Frances E. Beardmore Macdonald, died in 1930.

Dr. John A. Macdonald, a medical practitioner for nearly half a century in Markham, Ont., aged 76, died suddenly on December 2, 1944, when stricken with a heart attack in his office. His practice extended to many parts of York County, and he had interesting reminiscences of the "horse and buggy days".

Coroner for York County, Dr. Macdonald was a former M.O.H., for Markham. Born on the 4th Concession, Markham Township, he was the son of the late Adam S. Macdonald, one-time principal of Wellesley public school, Toronto. In his younger years he was a keen bowler and the winner of a number of trophies.

Dr. Macdonald received his early education at Jarvis Collegiate, Toronto, and was a graduate in 1890 of the University of Toronto Medical College. He established a medical practice in Markham in April, 1895.

Surviving are his widow, Mary Fleming Macdonald; a daughter, Innis Macdonald, of Markham; two sons, Robert, of Markham, and Fergus, Toronto, and four brothers, Fergus, Thomas, Norman and Ralph, all of Toronto.

Dr. Duncan Ferguson MacLachlan, of Windsor, Ont., died on October 14, 1944, at his home. He had been practising in Windsor since 1915. He graduated from the University of Toronto in 1905, but previous to that had taught school for six years. He was a member of the Canadian Medical Association and the Essex County Medical Association. Besides his widow he is survived by two daughters, Mrs. V. W. Collins, of Cleveland, Ohio, and Margaret, at home; also three sisters and a granddaughter.

Dr. William James McNichol died at his residence in Hamilton on October 27, 1944. Dr. McNichol graduated from the University of Toronto in 1898. He is survived by his widow.

Dr. Arthur Atkinson Milligan, active as a medical practitioner for more than 30 years, died on October 23, 1944, at the Toronto Western Hospital, after three months' illness. He had been retired two years. Born in Toronto, he was the son of the late Robert J. Milligan, at one time associated with *The Mail,* and Rebecca Atkinson Milligan. He attended local schools and was a graduate of Trinity Medical School. Dr. Milligan's wife died three years ago. Surviving is a sister, Miss Frances Milligan, of Toronto.

Dr. James A. O'Brien passed away recently at his home in Loverna, Sask. Dr. O'Brien graduated from the University of Western Ontario in 1910 following which he practiced at several points in Saskatchewan after his registration in 1913.

Dr. Richard Parsons*

AN APPRECIATION

The sudden death of Dr. Richard Parsons, of Red Deer, Alta., was a great shock and brought grief to the many friends he had made during his busy lifetime. For he had a genius for friendship which was equal to his skill as a surgeon, and while he revelled in the Society of good literature, he was not bookish, but was also a friend of, and a friend to man.

He has left his mark upon Red Deer and district. In memory, this mark is deep-carved upon the hearthstone of many a home, it speaks bravely from the lips of old friends and is carried in the plastic heart of many a boy and girl. In old neighbourhoods and especially farm neighbourhoods, people come to know one another, not clothes knowledge, nor money knowledge, but that sort of knowledge which reaches down deep into the hidden springs of character.

He performed a notable service for his community, partly because of his skill in treating suffering mankind and also because of the breadth of his training, but not less because of the unshakable integrity of his character and his devotion to the things of the mind in an intensely practical age, which chiefly esteems worldly success. His native ability, his learning, his powers of judgment, he carried as if he were unconscious of them. Never did pose or insincerity mar the impression of integrity or simple honesty. His strong convictions were held in check by his desire to marshal all the relevant considerations before forming judgment.

He was that somewhat rare phenomenon of a skilled physician and surgeon, original and highly competent in the treatment of disease, but, who was also intensely interested in health and life and living. To have known him intimately as confrère and friend was a great good fortune, a high privilege and a liberal education. He was keen and forward-looking to the end and to be associated with him was to be mentally stimulated.

As he grew older, he gave up shooting and sports as a relaxation from the cares of practice and sought more and more the pleasures and satisfactions of literature. He forsook the gun club for his large and carefully selected library. He had literary appreciation, insight and enthusiasm. The results of his reading and thinking had a determining influence on the taste and thinking of those who came close to him and shared his confidence. He had a culture which was varied, rich, and of great extent and he often surprised and delighted one by his knowledge and attainments, scientific, philosophical and literary. This with the experience of wide travel, for he had toured Europe, Asia and South America, gave his life a deeper meaning and wider horizons than most.

The fame of such a man rarely penetrates beyond a quite limited circle. Some of his intimates may be impressed by his qualities of mind and character but of these, the general public knows little. A new medical discovery, (or pseudo-discovery) may familiarize the multitude with the name of the discoverer, but most men are too busy, or too completely absorbed in their own activities to devote much curiosity or interest to such inconspicuous human beings as the town doctor. A good doctor must be resourceful and the small town or country doctor, especially so. This is particularly true of pioneer days. He has not only to meet the problems of practice, but also those of transportation, remote and primitive hospital facilities, and all the varied complications of means and time and place. This tends to resourcefulness and Dr. Parsons had this quality in a marked degree and through it all he displayed that uncommon judgment which we carelessly call "common sense".

And now to those of us who knew him is left only the cedar chest of memory. Drawn on the plates of memory as with a tool of diamond, we carry him both in broadest outline and each least part of shade. And there hangs no picture in the gallery of hours gone to which we turn with more of pleasure and of good. Any of us will indeed be fortunate who, when departing, are remembered by half so many, half so long.

The road that he travelled is the fairer for his passing. As he fares forth in his last call into the unknown, those of us who had the priceless gift of his friendship, salute and stand with uncovered head, and pay grateful homage to the memory of one whose place cannot be filled, to one who though dead, still lives in minds and bodies made better because he passed their way.

"How good is man's life, the mere living! How fit to employ
All the heart and the soul and the senses forever in Joy."

W. G. ANDERSON

* Notice of Dr. Parsons' death appeared in our November issue last, p. 484.

Dr. Joseph Russell Patterson died early in November, 1944, aged 56. In him Medicine Hat has lost one of her honoured physicians. He attended Queen's University, Kingston, Ont., where he graduated and received his degree in 1917. In 1919, he registered in Ontario, but in 1922, decided to come west and settled at Redcliff, where he practised for many years. Later he moved to Medicine Hat, where he enjoyed a fine practice until the time of his death.

Dr. Alexander Howard Pirie, consultant in roentgenology to the Royal Victoria Hospital and from 1911 to 1936 director of the department of roentgenology at the hospital and lecturer on x-rays at McGill University, died on November 15, 1944, at the Ross Memorial Pavilion after a brief illness. He was in his 69th year.

Dr. Pirie came to Montreal from St. Bartholomew's Hospital, London, in 1911 at the invitation of the governors of the Royal Victoria Hospital.

He was born on Christmas Day, 1875, in Dundee, Scotland, the son of Dr. G. C. Pirie and educated at St. Andrew's and Edinburgh Universities and the Sorbonne, Paris. He took his medical degree at the age of 22, and followed it with a year of travel round the world, during which time he visited Canada for the first time.

After the usual year of internship, Dr. Pirie set up in practice in Harley Street, and held appointments at several of the largest London hospitals. He was a Fellow of the Royal Society of Medicine, London, and of the British Institute of Radiology and one time secretary of the Roentgen Society of London.

In 1911 he was invited to Montreal by the Governors of the Royal Victoria Hospital as radiologist to that institution and was one of the pioneers of radiology on this continent. Under his direction and versatile ingenuity the radiological department of the hospital enjoyed progressive growth and enlargement, often the honour of first use in Canada of new discoveries in the fields of roentgenology and photography, such as the Coolidge tube and colour photographs of skin lesions. His love of birds and flowers, his ability as a woodcarver and the other characteristic facets of his personality will be long remembered by his colleagues and former understudies. He was chairman of the x-ray section of the Canadian Medical Association on two separate occasions, delegate from Canada to the International Medical Congress of 1925 and 1928, and held a R.C.A.M.C. majority with the Canadian Expeditionary Force from 1915 to 1919. In 1932 he was awarded the gold medal of the American Roentgen Society for his outstanding work and valuable contributions in the field of radiology. He was the author of a number of specialized technical works on this subject.

In 1903 Dr. Pirie married Miss Ethel Martin, daughter of an Ontario physician and an authority on the birds of eastern Canada. The first Mrs. Pirie

died in 1938. In 1939 Dr. Pirie married Miss Mary Sager, of Montreal, who survives him. He is also survived by four sisters, Mrs. Agnes Kinnear, Mrs. Gibb Mitchell, Mrs. John Donaldson and Miss Margaret Pirie, all of Scotland.

Morris W. Thomas, M.D., C.M. Dr. Thomas was born in Bruce County, Ont., in 1882, coming from a staunch Canadian stock. When he was four years of age his parents moved out to Victoria, B.C., and Morris received his schooling in that pleasant land, in various institutions, ending up with Victoria High School. He entered medicine at McGill, graduating in 1913. Following his graduation, he interned at Jubilee Hospital in Victoria, till 1914 when war broke out. He entered the Services through the C.A.M.C., and went overseas, where for three years, in France and elsewhere, he served in various units, returning to Victoria later to resume practice.

He continued in general practice in Victoria till 1935, when, fortunately for the B.C. medical profession, he was persuaded to undertake the duties of Secretary of the B.C. Medical Association, and also of the Council of the B.C. College of Physicians and Surgeons. He held this post, to the complete satisfaction of all concerned, till his tragic death in November, 1944.

Dr. Thomas was a uniquely apt man for his work. He had a character moulded of many features, which seems to have exactly fitted him for the duties he undertook in his new position. He had unbounded energy, and a real devotion to organized medicine. He had an unusual capacity for friendliness, and his interest in every individual medical man in his parish, was not in the least assumed—it was genuine and profound. He was tireless in his efforts to secure better conditions of practice, better terms of contracts, improvements in status, in location, and so on. Each medical man's problems were his problems, and he dealt with each one individually. Each medical man was his personal friend, and he spent himself tirelessly in his friends' behalf.

He was a man of strong convictions, and of a rare integrity and honesty of purpose. He could not be budged, once he had made up his mind on the principle involved, and this made him a valuable man in his place, since he could be depended upon not to weaken or compromise on the principle involved. He was, too, fearless in expressing his views, and once having taken a stand, in maintaining it. One gathered that he rather enjoyed a good fight.

He had considerable gifts as an organizer, and any meeting or convention entrusted to his management and care was sure to be a success, and admirably and smoothly conducted. He took a great pride in seeing that there were no squeaks in the machinery.

Dr. Thomas had certain hobbies. His first and main hobby was undoubtedly fishing, and he particularly loved the waters of the Cowichan River, where he met his death. To him the reaches of this river conveyed an especial sense of beauty and happiness, and he preferred fishing there to any other place. He remarked once that he would like to think that after his death, his ashes might be scattered on the face of the river he loved so much, the Cowichan. One is reminded of Algernon Blackwood's "The man whom the trees loved". Dr. Thomas loved the swift water, the sport of the fisherman, the thrill of the catch, and the waters, it would seem, loved him, and called him to their embrace, as the trees called the man they loved. In one sense, it was a happy ending for our friend—but a sad one to his family and friends.

The work that he did was good and sound. He left his work in good shape, with no loose ends, all in order, ready for the next man to take up and go on. His mantle, however, was the mantle of a very worthy man, and it will be hard to find an Elisha to don it worthily. The profession of British Columbia, (yes, and of Canada, for his work, with that of other provincial Secretaries, had wide ramifications) owes him much, and thanks him sincerely. We shall miss his genial, friendly witty personality, his counsel and his wisdom, his courage and his support and help in our problems and difficulties. But he leaves a pleasant and a fragrant memory—no enemies, and none to detract from his praise, but many who, like the writer of this, who knew him well, and worked in close touch with him for many years, will miss him sorely.

To his wife, who survives him, and his family, our condolences and sympathy are due for the loss of their husband and father. J.H.M.

News Items

Alberta

A physician in Edmonton applied for membership on the medical staff of the Royal Alexandra Hospital; this was refused by the Hospital Board, without giving any reasons for their refusal. An action was taken by the physician in the Alberta Supreme Court, to compel the Hospital Board to accept the application and appoint the applicant.

The judge gave a verdict compelling the Board to accept the physician as a staff member, as he considered "natural justice had not been given" the applicant, no direct charges having been made nor given to the physician, which he might have been able to refute.

The Provincial Hospital regulations however read as follows: "The Hospital Board shall appoint a medical staff of qualified physicians and surgeons, the members of which shall hold their appointments during the pleasure of the Board."

As will be seen, nothing in the regulations compel the Board to give reasons for appointment nor for refusal to appoint.

The Hospital Board appealed the case and the Alberta Court of Appeal has just given its decision in favour of the Board and against the physician. In rendering judgment the Court stated that the conception of the applicant's solicitor and the trial judge was at fault, inasmuch as there were no charges, and there were therefore no charges to be answered.

Some time ago the Federal Government to meet the need for civilian physicians, agreed under certain circumstances to release temporarily, physicians from the Forces. Several applications were sent from municipalities but when the final financial responsibility was placed on the municipality, local authorities hesitated. One has accepted and the physician has arrived and is installed at Barons.

The Anti-Tuberculosis Association has announced that the second portable x-ray equipment, ordered months ago will arrive shortly, and will be turned over to the Provincial Government, for a general check-up of the Alberta citizens. The first outfit which has been in use for over one year, has averaged over 1,000 x-rayed per week since operations commenced.

The annual election to the Council of the College of Physicians and Surgeons is being held in Districts 2, 4 and 6. All sitting members are up for re-election and in each case a second or third man has been nominated, thus the results will not be known until the end of the month of December.

G. E. LEARMONTH

British Columbia

The profession of British Columbia has lost a devoted servant in the person of Dr. Morris W. Thomas, who was drowned on November 11 while fishing in the Cowichan River. An obituary appears elsewhere, but his loss is being very keenly felt, not only by his

friends, who were legion, but as a very essential member of the medical organization of the Province.

The Medical Services Association of British Columbia is rapidly becoming a very strong organization. Its fourth annual report published in the *Bulletin* shows steadily and rapidly increasing membership and a very good financial condition. A change has been made in its setup, in that hospital care has now been dropped from its benefits, and is being assumed instead by the local group and Blue Cross plan. The list of membership firms is impressive, and includes some of the largest employers of labour in the Province. The scheme works well from the medical man's point of view, and is a model for this type of medical service.

Gradually medical men are drifting back into civilian practice after terminating their services in the Forces. Amongst these are Dr. R. R. Laird, who is now practising at Hedley, B.C. Major Laird, as he was then, distinguished himself on the beach at Dieppe; was made prisoner, and lost a leg as a result of wounds.

Dr. H. Roy Mustard, formerly Colonel Mustard, O.C. with No. 13 Field Ambulance, has also returned to practise in Vancouver.

Another returned officer is Dr. A. S. Underhill, who served as Flight-Lieut. in the last war and has been Medical Officer with the R.C.A.F. during this war.

The election for Mayor of Vancouver, which takes place shortly, has as contestant Dr. G. H. Worthington, who has practised medicine in Vancouver for many years, and has been alderman of the city for a considerable while. Dr. Worthington is associated with many organizations of civic importance. His two sons, Lieut.-Col. Don Worthington and Major Jack Worthington were killed overseas within a few days of each other in Normandy. Both of them showed conspicuous gallantry and leadership.

A strong effort is being made at the forthcoming civic elections to gain the support of the public for the passage of a bill to construct a new nurses' home at the Vancouver General Hospital. The housing and living conditions of nurses in training at this hospital have long been a disgrace to a modern city, and conditions have come to a serious state. The war and its effect upon civic finances has hitherto made it impossible to remedy this difficulty, but the Provincial Government has undertaken to assist substantially in the realization of this project. The public has been invited to visit the nurses' home and see for themselves how urgent is the need for proper, one might say even decent, accommodation.

Colonel T. A. Lebbetter, Executive Secretary of the Canadian Medical Procurement and Assignment Board, Ottawa, was in Vancouver on December 8 to discuss rehabilitation of medical officers. J. H. MACDERMOT

Manitoba

Lieut.-Col. G. Stewart Musgrove, R.A.M.C., arrived in Winnipeg November 30 on leave to visit his wife and his parents, Dr. and Mrs. W. W. Musgrove. In 1935 he received a commission in the Royal Army Medical Corps and after a course at R.A.M.C. College, Millbank, England, went to India where he served eight years rising to be A.D.M.S.

It is reported that Major Cherry Bleeks, R.C.A.M.C., who returned to Winnipeg in October, will take a post in the Winnipeg General Hospital as resident in obstetrics and gynæcology after being released from the armed forces.

The 1943 annual report of the Manitoba Department of Health and Public Welfare just issued shows that the maternal death rate in Manitoba for 1943 was 2.3 per 1,000 live births, the lowest rate to date.

The Sanatorium Board announces that in the last year 31,651 persons were x-rayed in Manitoba and that 81 clinics were held at various points in the province.

Up to November 20, 1944, enrolments in Manitoba Medical Service, the voluntary prepayment scheme initiated by the Manitoba Medical Association, were 2,466 for the medical or total coverage plan and 626 for the surgical or restricted plan.

Manitoba graduates offer their congratulations to Dr. Joseph Pritchard (Man. '17), who has recently been appointed pathologist to the Montreal General Hospital and director of the department of pathology and bacteriology. Dr. Pritchard went to the pathological department of the Montreal General Hospital from Manitoba Sanatorium, Ninette, where he was assistant to the late Dr. D. A. Stewart.

The Manitoba Medical Women Students' Association has gathered a fund to create a memorial to the late Dr. Sara Meltzer. The income of the fund will be utilized to provide a bronze medal and a cash prize to be awarded to the fourth year student in medicine who has established the best all round record in the first four years of the course. The decision is to be based upon both personal and scholastic qualifications. The first award will be made to a student in the fourth year class of 1944.

Lieut.-Col. Percy G. Bell, D.S.O., has retired as District Medical Officer M.D. 10, and has been replaced by Lieut.-Col. W. M. Musgrove. ROSS MITCHELL

New Brunswick

Major D. A. MacLennan, of Campbellton, presently posted to the Sussex Military Hospital was granted an *ad eundem* fellowship by the Royal College of Physicians and Surgeons of Canada at their meeting in Ottawa October 27, 1944.

Dr. Charles MacMillan, Chief Medical Officer of the N.B. Department of Health was elected president of the Canadian Public Health Association at the annual meeting at Toronto November 8, 1944.

The problem of venereal disease control was thoroughly discussed at a meeting in Saint John at which Major J. D. McKenna presided. Present were Dr. F. A. McGrand, Provincial Minister of Health; Dr. Chas. MacMillan, C.M.O. Department of Health; Lieut.-Col. R. M. Pendrigh, D.M.O., H.Q.M.D. No. 7; Dr. C. L. Emerson; Major H. G. Monks; Judge Rev. L. M. Peperdene of the Juvenile Court and medical officers of the army and navy.

The Board of Commissioners of the Saint John General Hospital at their last meeting appointed a special committee to study and report upon the possibility of establishing postgraduate facilities in the hospital for demobilized medical officers from the armed forces.

It was learned lately with regret that Group Capt. A. A. G. Corbet of Eastern Air Command has been confined to hospital suffering from a severe jaw infection. His colleagues wish for his speedy recovery.

Dr. A. T. Leatherbarrow of the medical staff of the D.P.N.H. at Lancaster Hospital has returned to his usual duties following postgraduate work in Physical Medicine in the United States.

Dr. H. E. Britton, of Moncton, was elected president of the Medical Council of N.B. at the annual meeting of the Council in November.

Dr. H. A. Farris, of Saint John, is spending a short time with old friends at Saranac.

Dr. T. Earle Grant, of Saint John, is at present in Toronto spending some weeks in special studies.

A. S. KIRKLAND

Nova Scotia

A meeting of neuropsychiatrists, as far as is known the first in the Maritimes, met at the Dalhousie Public Health Clinic, Halifax, November 22, 1944. Fourteen physicians were present, of which ten were from the Armed Services and the Department of Pensions and National Health. Dr. H. Seagar gave a paper on "Electric shock therapy", followed by Dr. R. O. Jones, whose presentation was "Interviewing and clinical personality study". Without any formal organization this group plans to meet monthly in future. Speakers at the next meeting will be Major Carscallen and Dr. Clyde Marshall.

The many friends of Dr. R. S. Gass, director of tuberculosis control for the State of Tennessee for the past 10 years will be pleased to learn that he has been commissioned senior surgeon in the United States Public Health Reserve Corps with a rank of Lieutenant-Colonel. He left recently for overseas duty with the United Nations Relief and Rehabilitation Administration as consultant on tuberculosis. Dr. Gass was a graduate in medicine from Dalhousie University in 1925 and is a native of New Glasgow.

The Provincial Medical Board held its annual meeting at Halifax on November 30. Dr. J. G. MacDougall and Dr. H. L. Scammell were re-elected President and Registrar respectively.

In November Lieut.-Col. O. G. Donovan, after 40 years' service, resigned as Officer Commanding, 22nd Field Ambulance, Reserve. Dr. Donovan saw active service during the whole of Great War I. He was one of the Canadian representatives at the coronation of His Majesty, King George VI.

Dr. E. Pearl Hopgood of the staff of the Nova Scotia Hospital has been appointed examiner in Medical Nursing for the Registered Nurses Association of Nova Scotia.

H. L. SCAMMELL

Ontario

The University of Western Ontario at the autumn convocation conferred the LL.D. degree on Dr. J. M. Brown, of Los Angeles. Dr. Brown is professor of otolaryngology in the University of Southern California and is a Past President of the American Laryngo-Rhino-Otological Society. He has been a life member of the Alumni Association of U.W.O. for many years.

The Academy of Medicine, Toronto, was addressed on December 5 by Dr. Reed M. Nesbit Associate Professor of Surgery, Ann Arbor, Mich. His subject was "The treatment of prostatism". The meeting was preceded by a dinner in the Academy.

A special meeting of the Council of the Ontario Medical Association was held in Toronto November 15 and 16. The discussions were on a report by Dr. Logan, of Lindsay, Chairman of a Committee on Health Insurance in the Province of Ontario. This report was published in detail in a recent number of the *Journal*. After much debate the report was returned to the Board of Directors for further study.

The second day was given to consideration of a Plan for surgical care originated by the Plan for Hospital Care or "Blue Cross Hospital Plan" which has been successfully operating for some years. The idea of providing for medical as well as surgical care is not considered possible as yet because the determination of cost is still uncertain. The services agreed upon by the Council were obstetrical care, all cutting operations, treatment of fractures, emergency treatment following accidents, x-ray diagnosis and treatment, cystoscopic examinations, anæsthetics and assisting at operations. Certain exclusions were listed including "plastic operations for beautifying purposes". This plan if put into operation is to be reviewed after one year.

Lieut.-Col. Hager Hethrington, Lieut.-Col. Clifford Watson and Lieut.-Col. T. G. Heaton have been returned to duty in Canada. Lieut.-Col. Heaton goes to Toronto Military Hospital, Toronto, as chief in the medical wards to succeed Lieut.-Col. J. R. E. Morgan who has been transferred to Camp Borden to the corresponding post in the hospital there.

The retirement of Dr. John Oille from his professorship in the University of Toronto was marked by a complimentary dinner given by a few of his many friends last month. It is a satisfaction to the profession in Ontario that he has not retired from practice. A generation of students have blessed him for his ability as a teacher and his colleagues have trusted him for an equal span of years as a wise and competent consultant.

Capt. G. C. Balfour in a recent letter to the *Journal* writes from overseas "The only change I would like to suggest is more complete Provincial news items—they're like a letter from home and read eagerly by all for scraps of news and familiar names". This appeal touches the conscience of at least one of the writers of Provincial news. He does his best but has failed in securing co-operation from the secretaries of local societies. "Scraps of news" are important but very hard to collect. They would be welcomed if sent direct or to the Secretary of the O.M.A.

M. H. V. CAMERON

Quebec

McGill University has inserted in its war records' roll the names of three more of its staff members who have been given promotions within the R.C.A.M.C. overseas.

Lieut.-Col. C. Alexander McIntosh, assistant professor of medicine, has been raised to colonel and appointed surgical consultant to the Canadian Army in Italy.

Lieut.-Col. John H. Palmer, F.R.C.P.(Lond.), lecturer in the department of medicine at McGill, also has been promoted to colonel and appointed medical consultant to the Canadian Army in Italy.

Major Eric MacNaughton, F.R.C.S.(C), who served as a demonstrator in the department of anatomy at McGill has been promoted to lieutenant-colonel and made officer commanding in surgery in No. 20 General Hospital. The promotion and appointment of Lieut.-Col. Gordon Copping, another well-known McGill man, as O.C. in medicine of No. 20 General Hospital, was announced previously.

Wing Comdr. John G. Howlett, of Montreal, medical consultant to the R.C.A.F. overseas, has been admitted a Member of the Royal College of Physicians and Surgeons of England, following examinations, it was learned here. A graduate of medicine of McGill University, and a member of the staff of the Royal Victoria Hospital, Wing Commander Howlett joined the Air Force in January, 1941, and after holding various appointments in Canada went overseas last April.

Il nous fait plaisir d'annoncer que le Professeur Henri Laugier, autrefois professeur de physiologie à l'Université de Montréal, puis recteur de l'Université d'Alger, a repris sa chaire de physiologie à la Sorbonne; le Pr. Laugier occupait cette dernière chaire au début des hostilités en 1939.

L'Union Médicale du Canada vient de publier,—livraison de novembre,—un numéro spécial consacré à la médecine française. Ce numéro est un hommage à la France libérée et à la science médicale française.

JEAN SAUCIER

Saskatchewan

There have been two recent enlistments with the R.C.A.M.C., Dr. W. L. Kurtze, of Regina, and Dr. F. B. Maxfield, of Canora. Several medical officers, however, are being released for civilian duties; they are, Dr. L. Goluboff, of Saskatoon; Dr. S. Kobrinsky, formerly of Mazenod; Dr. J. B. Trudelle, of Regina; Dr. G. Bicum, formerly of Elstow; and Dr. A. J. McDougal, formerly of Abernethy. Captain E. I. Shapiro has been seconded to Mankota to releave the dire need for medical services in that district.

Other changes in the Province are that Dr. A. M. Clare, formerly of Langenburg, Sask., has opened a practice at Neepawa, Manitoba; Dr. H. I. Houston has re-opened a practice at Bethune; Dr. T. F. Waugh who was practising at Leroy has taken up residence in Victoria, B.C., and Dr. Paul Moses, formerly of Eatonia is residing at Sudbury, Ontario.

Friends of Dr. A. W. Argue will be sorry to hear that he has been a hospital patient for about two months. Dr. Argue is now in the Regina Grey Nuns' Hospital, but it is hoped that he will soon be up and around once more.

It has been announced that Dr. Donald F. Moore, of Regina, has been appointed associate Professor of Pathology at the University of Saskatchewan and pathologist at the St. Paul's Hospital, Saskatoon. Dr. Moore, a graduate of the University of Toronto in 1934 with honours, has been pathologist at the Regina General Hospital and the Grey Nuns' Hospital since 1938. One has only to visit the Pathological Department of the Grey Nuns' Hospital to see the interest and enthusiasm which Dr. Moore manifests in his work.

A special meeting of the Saskatoon and D.M.S. was held at the Bessborough Hotel November 24 to hear Dr. G. F. Buchan, medical officer, Willesden, London, England. His outline of medical economics, and health insurance program and problems were much appreciated by the large turnout. A vote of thanks was moved by Dr. E. R. Myers. Dr. Buchan also spoke to a special meeting of the Regina D.M.S. on November 23.

Regina's Infant Mortality Rate:

Canada's High Commissioner to Australia says chidingly in a letter to a Regina pædiatrician:

"However the real purpose of my visit was to reach a conclusion before I left here as to whether or not the Children Specialists were necessary and whether or not the game was in actuality a racket. For the purpose of my study I went to several native settlements where I found that the children were born on the open prairie without hospital, without doctors, without nurses, and also minus anæsthetics and other medical devices. The child is just given a shake and never clothed and sleeps in the corner of a wind-break with the rest of the family. It is fed by the mother for three or four years when it is taken off this feed and then fed for the rest of its life on roasted snakes, lizards, grubs and worms, with the odd bit of boiled root. I did not see any rubber gloves and certainly I did not see any glass partitions separating the child from spectators. Certainly I did not see any doctors running around with masks tied over their faces, and to my amazement, I learned that the infant mortality rate was infinitely lower than it is in the City of Regina." Lizards can be very tasty, if properly dressed!

H. D. HART

General

The following have been admitted to fellowship in the American College of Surgeons, in 1944.

Alberta.—R. MacGregor Parsons, Red Deer.

Manitoba.—Wilfrid S. Peters, Brandon; Wilfred D. Smith, Winnipeg; Paul H. T. Thorlakson, Winnipeg.

Nova Scotia.—W. Alan Curry, Halifax.

Ontario.—Charles A. Buchanan, London; Austin J. Craven, Brantford; Jacob Goldstein, Toronto; Howard Evans Lowrey, North Bay; Samuel Norris, Toronto; Maurice W. Nugent, Toronto; Rodolphe Tanguay, Sudbury; Clifford S. Wilson, Kitchener.

Quebec.—Georges Emile Cloutier, Montreal; Campbell M. Gardner, Montreal; Frederick G. Hicks, St. Anne de Bellevue; Harry S. Morton, Richard M. H. Power, H. Gurth Pretty, Albert Ross, J. Carl Sutton, all of Montreal; Charles Vezina, Quebec.

Brig. Charles P. Fenwick, aged 53, St. John's, Nfld., has been promoted to the rank of major-general and appointed Director General of the Canadian Army Medical Services, succeeding Maj.-Gen. G. B. Chisholm, recently seconded to the new national health department, as deputy minister.

Defence Headquarters said Gen. Fenwick has been serving overseas as deputy director of medical services at headquarters of the 1st Canadian Army in northwestern Europe. He will arrive shortly to take over his new duties.

Born in Newfoundland Gen. Fenwick obtained his medical degree from the University of Toronto and subsequently studied at the University of London.

During the Great War, serving with the rank of captain, he was awarded the Military Cross.

British Pharmacopœia Commission. — The General Medical Council will publish in the near future, a Seventh Addendum to the British Pharmacopœia, 1932, in which certain new monographs, and certain modifications of existing monographs, will be included. Arrangements have been made for a limited number of advance proofs to be available for supply, on application, to manufacturers of the preparations described therein, in order that facilities may be provided for the supply of substances in accordance with the new specifications, as soon as they become official.

The Seventh Addendum will contain the following new monographs:

Amethocainae Hydrochloridum.
Amphetamina.
Amphetaminae Sulphas.
Cyclopropanum.
Dextrosum Hydratum.
Injectio Insulini Protaminati cum Zinco.
Liquor Sodii Citratis Anticoagulans.
Liquor Sodii Citratis cum Dextroso.
Oestradioli Monobenzoas.
Oestronum.
Pentobarbitonum Solubile.
Potassii Sulphas.
Progesteronum.
Strephanthium-G.
Sulphacetamidum.
Sulphacetamidum Solubile.
Sulphadiazina.
Sulphadiazina Solubilis.
Sulphaguanidina.
Sulphapyridina.
Sulphapyridina Solubilis.
Sulphathiazolum.
Sulphathiazolum Solubile.
Theophyllina cum Aethylenediamina.
Thiopontonum Solubile.
Unguentum Hydrargyri Ammoniati Aquosum.
Unguentum Zinci Oxidi Aquosum.

Tablets.—A general monograph (including general processes, standards for uniformity of weight and a disintegration test) and 34 monographs on individual

tablets. There are also a number of amendments and revisions.

Manufacturers interested are invited to apply to the Secretary, British Pharmacopœia Commission, University College Hospital Medical School, University Street, London, W.C.1., for advance copies of the proofs.

Health in Great Britain.

[The following is a summary cabled from London of the *Ministry of Health Report* presented to Parliament on November 9. The Report shows the success of the British wartime nutrition policy and the ability of the British Medical Services to maintain a high standard of national health in spite of war strain.]

NEW LOW RECORDS IN DEATH RATES

The Report shows a new low record for 1943 in infant mortality which is described as "The surest index of the Nation's health". Other new low records are in maternal and neonatal mortality in stillbirths and in deathrates for children from one to ten years old. The figures for 1943 and comparative figures of 1942 and 1938 are as follows:

	1943	1942	1938
Infant mortality per 1,000 live births	49.0	50.6	52.8
Maternal mortality per 1,000 total births	2.30	2.47	2.97
Neonatal mortality (deaths in first month) per 1,000 births	25.3	32.1	28.3
Stillbirths per 1,000 births — total births	30.0	33.0	38.0
Deaths of children from 1 to 5 years old per 1,000 living	3.34	3.42	4.59
Deaths of children from 5 to 10 years old per 1,000 living	1.40	1.50	1.87

The Report states "Better nutrition has made a very important contribution to the further improvement in the health of mothers and children which is recorded in 1943".

RESULTS OF WARTIME FOOD RATIONS

In the above connection the Ministry of Food may be said to have achieved its declared aim of providing sufficient food to keep the population of the whole country fighting fit while reducing the total consumption of food. The rationing system ensures for the first time in history a properly balanced diet for all sections of the population. The equal distribution ensures the main sources, proteins and fats (meat, butter, margarine and bacon) and in addition protective foods for those who need them most (thus mothers and young children get extra milk and vitamins contained in orange juice and cod liver oil either free or at reduced rates as well as extra supplies of shell eggs).

WELFARE SERVICES

The Ministry of Health Report also shows the part played by the increased wartime provisions of maternity and child welfare services. At the end of 1943 there were in England and in Wales 1,939 antenatal and 893 postnatal clinics where doctors and fully qualified nurses provide free examinations and advice. (At the end of 1942 the numbers were 1,968 and 869). During 1943 542,177 women attended these clinics (77% of the total births) compared with 513,325 in 1942.

EMERGENCY HOMES AND HOSTELS

From the start of the war until the end of March, 1943, 105 emergency maternity homes and hostels with some 2,750 beds have been established in reception areas. In addition some 76 antenatal and postnatal hostels have been opened for mothers.

Infant welfare centres which give fully qualified supervision and advice on the health of children under 5 amounted to 3,825 by the end of 1943. These centres were attended by 1,171,560 children during 1943 (the corresponding figures for 1942 are 3,712 and 1,140,366).

HEALTH VISITORS

In 1943 Health Visitors (fully trained nurses giving advice in the homes on health and nutrition of mothers and young children) attended at least once 96% of all the children born; their visits total 5,180,720 (in 1942 4,582,825).

The number of wartime nurseries, provided for the care of young children whose mothers are engaged in war work, was increased by 306 in 1943, making a total of over 1,700. It may be noted that although women with children under 14 are not directed to war work, many volunteer for full time or part time work if provision is made for the care of the children. These nurseries are open for 12 to 15 hours and some for 24 hours per day.

RESIDENTIAL NURSERIES

Under the Government evacuation scheme some 400 residential nurseries were opened. These have accommodation for over 13,000 children and are for children whose parents are casualties and other "hard cases".

CAMPAIGN AGAINST DISEASE

During 1943, 1,039,942 children were immunized against diphtheria, this means that about 56% of all children under 15 are now immunized. A systematic campaign against diphtheria has resulted in a decrease in the number of cases for the second year in succession. Similar progress against other diseases is shown in the new low records since 1930 of deaths from typhoid fever, pleurisy, appendicitis, epilepsy and many other diseases.

Pay Allowances for Women Medical Officers in the U.S. Army.—Legislation under which women officers of the Army Medical Corps will be entitled to receive the same pay allowances for their dependents as are paid to all other commissioned personnel of the army became effective on October 1, 1944.

An act authorizing the commissioning of women physicians in the Medical Corps was approved in April, 1943, and provided that they should "receive the same pay and allowances and be entitled to the same rights, privileges and benefits as members of the Officers Reserve Corps of the Army". The Comptroller General subsequently ruled that they were not entitled to allowances for dependents.

The new law, designed to meet the Comptroller General's objections, is not retroactive to the date of women officers' commissions. The dependents for whom allowances may be paid are "husband, a child or children, or a parent or parents in fact dependent" upon the officer "for their chief support".

Approximately 75 women have been commissioned to date in the Medical Corps.

Book Reviews

Cæsarean Section. The History and Development of the Operation from Earliest Times. J. H. Young. 254 pp. 16s. H. K. Lewis, London, 1944.

In this attractive book Dr. Young gives an exhaustive history of the greatest operation in obstetrics. From the dawn of time man has been faced with the problem of the pregnant woman unable to deliver herself, or to have delivery effected, through the natural passages. The obstacles to safe operation through the abdomen, hæmorrhage, shock and infection, were so tremendous that at the end of the eighteenth century there had been only nineteen Cæsarean operations in Great Britain from which but two mothers and seven children were saved. Dr. Young points out the astonishing fact that up to the middle of the 19th century suture of the uterine wound had been done on only four occasions.

It was not till 1882 that Sanger brought out a reasonably safe method of suturing the uterus so that

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it was preserved instead of sacrificed as in the Porro operation of 1876. Since then not only have improvements in technique been made but the indications for the operation have been greatly extended. So extended, indeed, have they been that in one hospital in recent years the operation was performed once in every 6.3 cases! Improvements on the classical operation of Sanger, such as the extraperitoneal and low transperitoneal methods, offer increased hope in infected cases.

Attached to each chapter is an extensive bibliography. There is also a general index and an index of names and authors. Professor Miles Phillips has contributed a thoughtful foreword.

Dr. Young's book will interest not only obstetricians but students of medical history. It is a moving story of man's persistence against seemingly hopeless odds until there has been evolved an operation which saves two lives at no greater risk than any other major surgical procedure.

Æsculapius in Latin America. A. A. Moll. 639 pp., illust. $8.00. W. B. Saunders, Philadelphia; McAinsh, Toronto, 1944.

This volume, concise, attractively arranged and bound, is a history of medicine in the countries south of the Rio Grande. At a time when an increased knowledge and understanding of the peoples of Central and South America is imperative, such a book is of great value. The task of compilation, with such a diversity of peoples and languages to consider, must have been most diffcult, but the author has achieved perspective and an orderly presentation by using the device of short sections covering every aspect of medicine and public health. Thus we have a chronological source-book rather than a volume for consecutive reading. This enables the author to give an exhaustive listing of the hundreds of names and of all the pertinent details of every phase of the subject. The scheme as a whole and the text are not unlike those of Garrison's classical history of medicine.

The volume represents a tremendous amount of work. One may be assured that the material assembled is authoritative as the author, Dr. Moll, in his office of Secretary-Editor of the Pan-American Sanitary Bureau and by virtue of his association with the medical world of Latin America has not only had access to a myriad of records but speaks from experience and with intimate understanding. The subject is covered from the earliest times to the present. There are exhaustive appendices setting out the chronology of diseases in Latin America, a chronological historical tabular summary of Latin American medicine, and a bibliography arranged under the various countries concerned.

It will thus be apparent that this work taps a field of knowledge hitherto uncharted. It is a volume of first importance for every medical library, for its vast store of information which cannot be obtained elsewhere, and for its scholarly and intelligent point of view. It provides a background for such books on American tropical medicine as Charles Morrow Wilson's "Ambassadors in White" which appeared last year. It gives a better understanding of medical conditions and events in a part of the world virtually unknown to medical men at large, and indicates the achievements which Latin America on her own behalf has made in medical science.

Diseases of the Nose, Throat and Ear. I. S. Hall. 3rd ed., 459 pp., illust. $4.50. Livingstone, Edinburgh; Macmillan, Toronto, 1944.

This book although small in size covers the field of ear, nose and throat in a concise yet comprehensive manner which will be appreciated by student and general practitioner alike. It differs from most books of its class in that the descriptions of operations and methods of treatment are fully outlined. The book is readable, well arranged and abundantly illustrated. The author deals with the problems encountered in everyday practice, stressing important points, yet drawing attention to rarer conditions. He gives a thorough and enlightening description of methods of carrying out routine examinations so clearly that we are sure readers will find no difficulty in checking up on any faults in technique.

The appendix contains much helpful information dealing with the preparation for operation together with formulæ of many fine prescriptions.

Handbook of Diagnosis and Treatment of Venereal Diseases. A. E. W. McLachlan. 364 pp., illust. $4.50. Livingstone, Edinburgh; Macmillan, Toronto, 1944.

The author prepared this book to provide "a concise introduction to the principles of diagnosis and treatment of venereal diseases, suitable for the instruction of the elementary student, yet adequate for the busy practitioner desirous of refreshing his knowledge in treating cases in his own practice". He has succeeded in adequately accomplishing this aim.

The first section of the book deals with the diagnosis and treatment of syphilis and presents the subject in a clear, straightforward way, which should serve as a guide to efficient treatment by the practitioner. In dealing with various toxic complications of arsenical treatment, venesection with the withdrawal of twenty ounces of blood is recommended in arsenical encephalopathy. This advice would seldom meet with the approval of most syphilologists in this country. The second main section of the book deals with gonorrhœa. The subject is comprehensively and clearly covered. Instruction in treatment is simplified and should be easily followed.

The book is well prepared and generously illustrated by black and white and coloured plates. Those of skin manifestations and complications of syphilis are particularly good.

This handbook provides a concise and simple guide in the diagnosis and treatment of venereal disease for the practitioner and should find a place in the working library of any practitioner in any way interested in venereal disease. It is a working handbook and should be supplemented by more detailed textbooks, in a comprehensive study of these diseases.

Chirurgie de Guerre. H. Fruchaud. Tome I, Editions des Lettres Françaises, Beyrouth, 1943.

Ce volume, publié sous les auspices des F.F.C. est une belle réalisation scientifique si l'on considère les difficultés que l'auteur et ses collaborateurs ont eues à surmonter pour publier un ouvrage médical en exil.

Chirurgie de Guerre est divisée en onze parties. Les auteurs rappellent les étapes historiques de la question et exposent l'anatomie pathologique et la physiopathologie des plaies de guerre. Ils font la revue des soins immédiats des plaies et décrivent les principales techniques chirurgicales; ils étudient ensuite, d'après l'espect clinique des plaies, les indications thérapeutiques puis le surveillance des blesses et les traitements tardifs.

On retrouve dans cet ouvrage la classique clarté française de l'exposition et le souci de l'explication pathogénique. Les théories en cours et les techniques modernes sont discutées et critiquées avec un grand sens de la mesure. Malgré les difficultés typographiques, le volume est abondamment illustré. Il est présenté sous un aspect nouveau: celui de la France en guerre qui publie sur du mauvais papier des travaux excellents.

Vascular Responses in the Extremities of Man in Health and Disease. D. I. Abramson. 412 pp., illust. $5.00. University of Chicago Press, 1944.

This would be a valuable acquisition to any medical library. The author has developed a very difficult and controversial subject well. He has in each section

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He was chosen as physician of l'Hôpital Général by the Sisters in 1693. A year later he returned to France for further study. Returning to Canada aboard the "*Gironde*", he fought a severe outbreak of typhus and saved many lives including that of Mgr. de St. Vallier, Bishop of Quebec and founder of the Hôtel-Dieu, Quebec.

Papers written by Sarrazin on Canadian wild life earned him membership in the Royal Academy of Sciences (France). These works included anatomical studies of the lynx, muskrat, deer, moose, porcupine and the beaver. He catalogued 200 Canadian plants and also wrote a treatise on the production of maple syrup.

Sarrazin operated for what is believed to have been cancer on the persons of Sister Marie Barbier and Sister Elizabeth Cheron. He is reported to have performed several similar operations and "others more difficult". He is credited with the introduction of the pitcher plant (Sarracenia Canadensis) for the treatment of smallpox.

This great pioneer physician and surgeon received little or nothing from his patients. As Doctor of the King, he was granted 300 livres a year and even when this was increased to 600 livres, Sarrazin was so hard put that he expressed a desire to leave the colony. To prevent his departure and augment his income he was made a member of the Superior Court. Later, his emolument was increased to 2,000 livres per annum.

Still active at 75, Sarrazin fell ill and died of hemorrhagic smallpox at the Hôtel-Dieu, Quebec, on September 8th, 1734, after two days' illness.

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made an analysis of the different opinions and pointed out, where possible, the truth. Many practitioners know little of the work done on blood vessels and it is well worth reading this monograph to bring one up to the present knowledge of physiological and pathological changes in blood vessels. His treatment of this subject is almost wholly that of the dynamics of blood flow.

The blood flow is discussed in various pathological conditions. One is impressed with the careful work done by the author and the critical analysis of the work of others.

Infections of the Peritoneum. B. Steinberg. 455 pp., illust. $8.00. Hoeber, New York, 1944.

This book is an important contribution to medical literature. The author discusses the physiology of the peritoneum and gastro-intestinal tract including the various types of pain mechanism. He also discusses the pathological changes which occur in peritonitis and presents a clear picture of the defence mechanisms involved. The chief defence rôle he attributes to the polymorphonuclear leucocyte.

The book is chiefly remarkable for its unique approach to the problem of peritonitis. The author, who is Director of the Toledo Hospital Institute of Medical Research, has been studying peritonitis experimentally for eighteen years. He therefore naturally presents the viewpoint of the laboratory or research worker. This is illustrated by his emphasis upon the value of diagnostic puncture of the abdomen with examination of smears obtained, as a diagnostic and prognostic aid. He maintains that abdominal puncture is safe and that the bowel cannot be injured except in the presence of extreme distension or adhesions fixing the bowel to the parietes at the site of the puncture. The technique of abdominal puncture is described, as is that for the examination of smears. It is claimed that valuable diagnostic and prognostic information can be obtained by noting the number of free bacteria present, the number of polymorphonuclear leucocytes, as well as the number of polymorphonuclear cells showing ingested bacteria. The value of a more detailed differential white cell count is also stressed, the number of "stab" forms or immature polymorphonuclear leucocytes being the best index of the severity of the infection.

While the author does attempt in a general way to correlate the clinical signs and symptoms with the pathological changes and findings on examination of the smear obtained on abdominal puncture, this is not adequately supplemented by case histories. The last chapter, while devoted to case reports, fails to give the preoperative clinical findings although the findings at operation are recorded, as well as those resulting from the examination of the smears obtained by diagnostic puncture. The book, however, provides a refreshing approach to an important subject and can be read with profit by every practitioner. It should also be studied carefully by every surgeon and is a *sine qua non* for those engaged in undergraduate or postgraduate teaching.

Technique in Trauma. Planned Timing in the Treatment of Wounds Including Burns. F. B. Gurd and F. D. Ackman. 68 pp., illust. $2.50. J. B. Lippincott, Montreal, 1944.

This little volume represents a timely contribution to a branch of surgery upon which attention has been sharply focussed by the war. It represents the authors' plan of treatment as developed in the wards of the Montreal General Hospital. Clinical cases are cited and excellent charts and pictographs illustrate the volume. Burns are classified in a very practical way into two groups, those requiring grafting, and those which do not require grafting. This distinction may not be apparent for several days, until it can be determined that complete skin destruction has occurred. Emphasis is placed on "timing" and also on the application of principles relating to disturbed physiology. The understanding of "timing" and its use should show results in improved mortality and morbidity figures. The treatment of burns as outlined is: first, the treatment of shock with heat, sedation, plasma, cortin, and complete blood studies; second, surgical cleansing of the burned area after the treatment of shock; third, the application of a pressure dressing incorporating the authors' sulfathiazole cream to prevent plasma loss and control of infection; fourth, infrequent dressing at periods varying from one to two weeks; fifth, early split-skin grafting, using similar pressure dressings as those used in the treatment of burns. The use of coagulants is deprecated because of delay in separation, injurious effect on incompletely burned skin, and their toxic effects on the liver.

The authors whole-heartedly endorse the principle as outlined by Orr and Trueta in the management of compound fractures and severe wounds. The use of "curtain drainage" and immobilization in plaster is stressed. In a concluding chapter Dr. R. R. Fitzgerald defines several pertinent problems relative to the surgery of trauma.

This volume should be welcomed, not only by those in general practice, but by anyone especially interested in the field of trauma, as it delineates the application of sound surgical principles. It is a particularly timely volume, in view of the fact that so much confusion is evident in the medical literature on the subject of trauma.

Supplemental Dental Treatment of Maxillo-Facial Injuries. W. K. Fry *et al.* 494 pp., illust. $5.50. J. P. Lippincott, Montreal, 1944.

Here is additional meat to the parent volume. The few pages on x-ray technique and interpretation are good. The passage on pathology and surgery with choice illustrations in colour is quite the high point of the volume. One cannot help but be mildly annoyed at this unorthodox procedure of producing a book and then a supplement. The authors might have been better advised to gather together in more leisurely fashion a single and well orientated volume. This book, as its predecessor, is necessary to the specialist but a bit confusing to the general practitioner of either medicine or dentistry.

Medical Diagnosis. Applied Physical Diagnosis. Edited by R. L. Pullen. 1106 pp., illust. $11.50. Saunders, Philadelphia. McAinsh, Toronto, 1944.

Here, in one volume, we have a book on medical diagnosis which covers the complete examination of the patient, literally from the top of his head to the tip of his toe. Every aspect of the physical examination of a sick person is covered most thoroughly and in such a manner that the physical findings are linked with known disease states, and point logically to the likely diagnosis. The various chapters have been written by men who are eminently qualified and known authorities on the particular section they describe. Throughout each chapter one sees the methods of diagnosis employed and the interpretation of the findings in the light of each individual region of the body and its relation to the patient as a whole. The choice of chapters is so complete and the handling of each individual chapter so basic and all-inclusive that both students and general practitioners will find in "Medical Diagnosis" a book that will completely fill their everyday needs in their practice of medicine. Regions of the body that in most textbooks on medical diagnosis are given only cursory attention, such as the skin, eye, endocrine, gynæcologic, orthopædic, neurologic and psychiatric examinations, are here fully considered.

The illustrations are truly superb and reveal most graphically and in an extremely clear and informative manner the physical findings and the method of examination employed. Dr. Pullen's fine editing of this book has resulted in a volume which will be a "must" on the bookshelf of every practitioner.

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Analysis and Interpretations of Symptoms. Edited by C. M. MacBryde. 1644 pp., illust. $5.00. Lippincott, Montreal, 1944.

The authors are to be complimented on producing a unique textbook written under ten separate headings and containing material which cannot be found in any other textbook of medicine. The articles do not deal with symptoms, complexes or syndromes, but are written to give the basis for analysis and interpretation of some of the commonest symptoms which bring patients to the physician. Emphasis is placed on the pathology of the symptoms, while its correlation with other symptoms and with physical and laboratory evidence is considered as important but secondary in the diagnostic method.

The authors have numerous headings such as in the Chapter on Fever by Paul B. Beeson, M.D., of Atlanta, Ga., which tells first of the mechanism of temperature control, and of the principal conditions, both physiological and pathological, which can cause fever. The final section deals broadly with the problem of diagnosis in febrile diseases of obscure etiology. Each chapter is of equal interest. The book is a valuable contribution to the study of disease and its treatment.

Diseases of the Chest. R. Cooke. 524 pp., illust. $7.50. Livingstone, Edinburgh; Macmillan, Toronto, 1944.

New medical and surgical textbooks continue to pour from the press. Every student graduating from medical school has a set of lecture notes which with polishing and the addition of illustrations might be made into a textbook of sorts. Perhaps it is this circumstance, together with the almost universal desire for authorship, which is responsible for the publication of so much literature of inferior quality. The remaining books which are well planned and well written propound a further difficulty; it is not easy to justify their production because the subject has already been well presented in some other easily available text.

The book under review easily passes both these critical obstacles. It is thoughtfully arranged and beautifully written. It is intended for medical students and should soon become as essential a reading as Lewis' work on circulatory disease and Cope's on acute abdominal disease have already done. Like these two, "Diseases of the Chest" deals with the diseases of a whole region and without being incomplete or too brief presents its material clearly and interestingly.

The reviewer could hardly be more enthusiastic about a book and regrets that this one was not available when he was in medical school. The student will save time, yet have a much better understanding of respiratory diseases, if he restricts his reading to this work.

Clinical Practice in Infectious Diseases. E. H. R. Harries and M. Mitman. 2nd ed., 570 pp., illust. $6.75. Livingstone, Edinburgh; Macmilan, Toronto, 1944.

This is a very complete and exceptionally well-arranged text. The subject matter deals not only with the ordinary diseases of childhood but also with the epidemic diseases of the nervous system, poliomyelitis, encephalitis and cerebrospinal meningitis; with typhoid and undulant fevers, influenza, tetanus, dysentery and the louse-borne diseases.

At the beginning of each chapter—a new feature in this edition—is a summary of the subject matter which follows, a summary which should be useful to the student who is reviewing for examinations. Should the student, however, be foolish enough to limit his reading of the book to the summaries, he would miss a most interesting, enlightening and well-written description of the diseases in question. The discussion rests on a broad base, historical and scientific, and develops logically to the consideration of the clinical aspects as they are observed today and the treatment practised in the best fever-hospitals right up to the present year. Because of this arrangement, the book should be valuable to the clinician or to the teacher of public health in preparing lectures and clinics.

The subject of treatment is emphasized throughout, a whole chapter being devoted to the sulfonamides, their history, indications for their use and associated dangers. Definite instructions for the use of diphtheria and scarlet-fever antitoxin are given in tabular form, considering the severity of the case, the proper dosage, and the suitable method of administration. These instructions make the book a particularly valuable addition to the library of the general practitioner, the pædiatrician and the physician in the armed forces.

Regional Analgesia. H. W. L. Molesworth. 90 pp., illust. 8s. 6d. H. K. Lewis, London, 1944.

This compact hand-book is written by a surgeon for fellow surgeons who wish to acquire a knowledge of the limitations and possibilities of all forms of anæsthesia. The author's tolerance for the advocates of other methods is typified by his opinion that extreme views are nearly always wrong and his plea not to condemn regional anæsthesia untried nor consider general anæsthesia obsolete because of recent advances in a sister art.

Spinal anæsthesia is quite properly left to the anæsthetist; the chapter dealing with it outlines the most common complications with sufficient emphasis to convince the operator that his patient is entitled to the undivided care of an attending anæsthetist. Such is not usually the case with the other forms of regional analgesia; these can usually be carried out more successfully and expeditiously by the surgeon himself. When the patient has been selected and prepared in accordance with the author's precepts and his technique of injection followed carefully, there has been little need for combining the regional block with inhalation or intravenous anæsthesia. The fundamentals of all varieties of regional analgesia are concisely covered. Application of a suitable method to any of the customary procedures in any area of the body is outlined in considerable detail. For the reader to whom the technique is presented—the surgeon already thoroughly familiar with the anatomy of the part involved—the directions will be ample to permit the duplication of the author's good results. However, for the anæsthetist more versed in the problems of inhalation anæsthesia than in general anatomy, the details will scarcely suffice in themselves. Anæsthetists and surgeons will nevertheless meet on common ground in the opening chapters covering the indications, contraindications, preparation of the patient, premedication, dosage of various drugs and the treatment of toxic effects. These problems are of equal importance to the anæsthetist in his practice of spinal anæsthesia and the surgeon extending his use of regional analgesia. The admirable clarity with which the author deals with these fundamentals will commend the text to all.

BOOKS RECEIVED

Manual of Urology. R. M. LeComte. 3rd ed., 305 pp. $5.00. William & Wilkins, Baltimore; University of Toronto Press, Toronto, 1944.

Experimental Basis for Neurotic Behaviour. W. H. Gantt. 211 pp., illust. $4.50. Hoeber, New York, 1944.

Into a Second Century with Procter and Gamble. Privately printed in Cincinnati, 1944.

Simplified Diabetic Management. J. T. Beardwood. 4th ed., 168 pp., illust. $2.00. Lippincott, Montreal, 1944.